INNOVATION IN AUSTRALIAN REGIONAL SMALL BUSINESSES:

Does its adoption and adaptation promote the evolution of innovative capabilities?

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Abstract

The small business sector is a significant contributor to Australia's economic prosperity, and is often described as an incubator for building the nation's innovation capabilities. The routine adoption and implementation of innovations such as new ideas, processes and products are espoused as a key driver of business success and survival of all sizes. However, while substantial volumes of research and business text focus on innovation within the small-to-medium business sector, debate remains about whether a paucity of empirical evidence exists to assist small business operators effectively plan, manage, and effectively measure the outputs of innovation activities. Hence, the overarching objective of this thesis is encapsulated by three primary aims: (1) to identify the enablers of innovation activities; (2) explore the potential development of innovative capability metrics and/or indicators; and, (3) examine how the identified enablers can be integrated into a conceptual model and innovation planning framework specifically for small businesses of less than 20 employees. This thesis is exploratory in nature, therefore, the proposed metrics and/or indicators, the conceptual model and planning framework all require further testing to ascertain their veracity and efficacy levels when applied in small business operating environments.

The paucity debate about the availability of empirical, evidence-based research specifically focused on small businesses remains for two reasons. The first concerns an observation from the research literature that the majority of innovation research is centred on large organisations. The second concerns innovation processes involving highly complex, interconnected, and multifaceted relationships comprised of both tangible and intangible inputs. As a consequence innovation outcomes and outputs can be hard to quantify, while the dynamic nature of innovation processes are difficult to measure accurately. Indeed, the innovation process can range along a continuum from radical to incremental and can encompass a multitude of typologies; whereby, the resulting outcome may be unquantifiable tacit knowledge creation. This thesis was undertaken to help us better understand the complexities small business operators are faced with in trying to implement and manage innovation, and to build on their innovative capabilities.

An initial review of the wider innovation literature identified two conjoint research problems in the context of small business innovation research. Discussed in chapter 1, the first problem is disparate consensus of a unilaterally accepted definition and theory of innovation generally in the context of regional small businesses. Because of its inherent complexity and the fact it occurs across all industry sectors, it is accepted that no one singular definition could adequately encompass what defines the innovation process. Nonetheless, there is widespread acknowledgement the innovation construct is defined as the adoption of something new in a process that creates or adds value to the adopting entity, and indirectly creates value for the adopting business's customer. The second problem, even though innovation metrics are available for large organisations, is a limited number of contextually appropriate innovation metrics and/or composite indicators capable of effectively quantifying regional small business innovative capabilities and outputs; particularly in micro-businesses with between 1-4 employees. The currently available innovation proxy measures, R&D expenditure and patent counts, do not account for the differences between small and large businesses such as resource limitations and operational structures.

A two-stage literature review process was undertaken for the thesis using two complimentary approaches; a traditional narrative and systematic literature review. The first stage involved a traditional narrative review of the wider literature; while the second stage involved a systematic literature review with the overall results detailed in chapter 2. Synthesis of these findings led to the development of the research aims and questions; in addition to providing the fundamental justification for the research design. Furthermore, the findings from the systematic literature review, covering 25 years of innovation research and focused only on research journals, provided strong evidence-based support in three major areas. These areas included: (1) the primary data findings; (2) answers to the research questions; and, (3) the foundations for development of the thesis outputs; while also supporting the use of a multi-methods research design.

The research design utilised a multi-methods approach; whereby, quantitative and qualitative methodologies are combined with multivariate analysis techniques. Discussed in chapter 3, the development of the research design was guided by adopting two complimentary paradigms; innovative constructivism and pragmatic pluralism. As with the multi-methods approach, these paradigms were deemed to accurately reflect

the complexity of innovation research. Two separate datasets are analysed, the first being a secondary dataset from a national innovation survey undertaken by the Australian Bureau of Statistics. The second dataset is primary data, with a sample of 100 North Queensland small businesses collected using semi-structured, face-to-face, interviews. A precoded questionnaire was used as the survey instrument; with a range multivariate analysis techniques applied to ascertain the strength of relationships between activities deemed to be enablers of innovation processes.

With over 100 variables within the primary dataset, the application of multivariate analysis techniques identified a range of activities identified as enablers of innovation processes. The results and findings of the analysis process are discussed in chapter 4. Using the SPSS 22.0 statistics package, the analysis techniques applied identified innovation process enablers with strong measures of association between a range of activities, procedures, and personal attitudes. A summary of the findings are then combined with the evidence from the literature review to provide the foundations for development of three contextually specific outputs pertinent to the small business sector. These outputs include: (a) a propositional inventory; (b) a conceptual innovation model; and, (c) an innovation planning framework.

To examine small business innovative capabilities more intimately, particularly the influence of personal attitudes and attributes, three innovation rich case studies are presented. Covered in chapter 5, and identified during the sample interviews, each business was invited to discuss their innovation enabling activities and personal approaches in further detail. The three businesses represented a diversification across industry sectors; accommodation/tourism, manufacturing/services and wholesale/retail. Congruent with the literature findings, all three businesses engaged in a wide range of activities which enabled innovation process to take place including customer engagement and proactive problem solving. Interestingly, none used any formalised planning procedures, preferring to use informal planning and gut instinct to build on their innovative capabilities and to inform their decision making procedures.

By synthesising the thesis findings, it is postulated that innovation adoption allows a small business to build innovative capabilities through an evolutionary process of natural selection. Having identified the enablers of small business innovation, the final chapter addresses the three primary aims previously the four research questions. It then

draws a definitive conclusion on the contextual inappropriateness of widely used innovation proxy measures developed for large businesses - yet still applied to small business operations, and proposes alternative measures focused on identifying innovative capability levels. A discussion on the contribution towards future policy development is posited, as is future research requirements. The final substantive conclusion is an assertion that innovation adoption in small businesses is akin to the natural selection process. Thus, adoption of new ideas, knowledge, processes, products or services allow businesses to continually adapt to changing markets and operating environments. If these adopted adaptations continue to create added value and increase the levels of the business's competencies in specific activities, they become embedded in the business's operating systems and knowledge banks. The result is an increase the business's ability to survive and prosper by providing a competitive advantage that allows for a better fit to meet changing operating environments. To invoke an evolution analogy, if a business's core DNA is based around customer service, then innovation is equivalent to a mutating gene that allows the business to continually adopt, adapt and evolve to better fit with the changing environments of dynamic market demands. Hence, so long as the core DNA remains relatively unchanged, small businesses succeed through a natural selection process; whereby, building innovative capabilities through evolutionary adaptation allows them to cater for changing market conditions and dynamic customer demands.

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CHAPTER 1

The status of small business innovation research

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1.1	***Introduction*** Introduces the thesis purpose by highlighting the importance of the small business sector to a nation's economy, and provides an overview of current small business innovation research.
1.2	***Innovation research background*** Discusses the history of innovation research, including the concept of creative destruction. Provides a brief insight into innovation from an Australian perspective, followed by discussion about additional innovation themes and concepts from the research literature.
1.3	***The research problem*** Identifies the broad problem area, and discusses the two main research problems identified. Presents an overview of inherent difficulties associated with innovation research, discusses the overarching objectives and primary aims, and proposes four research questions.
1.4	***Research justification*** Justifies undertaking research focused on the small business sector, followed by knowledge gaps identified within the research literature.
1.5	***Defining small business importance*** Discusses the important contribution small businesses make to a nation's economy such as contribution to Gross Domestic Product and creation of employment opportunities.
1.6	***Research design and methodology*** Proposes development of the research design and the choice of research methodologies. An outline of the thesis structure and chapter contents is presented.
1.7	***Definitions*** Examines difficulties of defining innovation because of its multidimensional nature, which includes the concepts of newness, reinvention and adoption. Posits a broad definition of innovation for this thesis adopted from the research literature.
1.8	***Limitations of scope and key assumptions*** Limitations of scope include operational differences of small businesses within different industries, and concern about a clear definition of innovation. Key assumptions include: innovation motivations; building innovative capabilities through knowledge; participation in networks and collaboration; and, use of a multi-methods approach.
1.9	***Summary*** Provides a summary of the chapter contents and introduces an innovation measurement framework.

It is now accepted that although innovation is a key driver of economic growth, it is a complex process that is difficult to measure. Because innovation rests on learning and knowledge creation...then many aspects of the innovation process are somewhat intangible. (Trewin & Paterson, 2006, p. 1)

1.1 INTRODUCTION

The small business sector is of significant importance to a nation's economy. Small businesses are significant because of their economic contribution and provision of employment opportunities. According to the former Minister for Employment, Workplace Relations and Small Business, Hon. Peter Reith, they are 'the engine room of the Australian economy, with boundless potential for growth, innovation and job creation' (Parker, 2000, p. 240). Because of their inherent flexibility and ability to move quickly, small businesses are deemed as the incubators of innovation by fulfilling niche markets, catering to emerging trends, or simply serving customer needs overlooked by larger businesses. Thus, the innovation process is espoused by academics, government agencies and business consultants as a key element for driving small business growth and sustainability. For example, the CEO of the Australian Institute of Management for Victoria and Tasmania, Tony Gleeson, emphatically stated: 'What we know from history is organisations that don't innovate, wither and die' (McManus, 2013, p. 36). However, several important research issues emerged from small business innovation research literature demonstrative of an extremely complicated and multifaceted research topic, discussed next.

An initial literature review on small business innovation research revealed several important research issues, and identified several research gaps. First, there are a multitude of complex inter-relationships involved in pursuing innovation processes (S. Laforet, 2009, 2006 #750; OECD/Eurostat, 2005; Tidd, Bessant, & Pavitt, 1997); particularly from a research perspective. For example, a plethora of distinctly different typologies of innovation exist in the research literature which cover a range between the continuum of the most well-known types of innovation - radical and incremental (Garcia & Calantone, 2002). The reason for this situation assert Garcia and Calantone is 'researchers devising ad hoc typologies to label degrees of innovativeness' (2002, p. 117). There are also many other influential factors that drive innovation activities and outputs such as; consumer demand, reinvention, reinnovation, adoption and adaptation processes. Second, there is an issue concerning a perceived paucity of innovation

research specific to small businesses in Australia (Becheikh, Landry, & Amara, 2006; Bhattacharya & Bloch, 2004; Prajogo, McDermott, & McDermott, 2013); particularly in the context of regional small businesses. According to Prajogo (2013) and Laforet (2009), the majority of innovation research focuses on large businesses, while the small and medium sector remains neglected. As a result of this identified research gap other research deficiencies concerning small business innovation were identified, such as an overabundance of definitions and lack of appropriate metrics, discussed next.

Identifying the knowledge gaps Other research gaps identified included a lack of general consensus as to what defines innovation (Bhaskaran, 2006; G. W. Downs & Mohr, 1979), and until recently there was a lack of innovation metrics developed specifically for small businesses (Arundel & O'Brien, 2009). First, there are a multitude of varying definitions to define both the construct of innovation and the innovation process, discussed in more detail later in the chapter. Broadly speaking, definitions range along a continuum from: the commercialisation of an invention (Schumpeter, 1934); the introduction and adoption of something new (E. Rogers, 2003); to the application of new ideas which create value for the business (J. Weerawardena, 2003). Indeed, Dewar and Dutton (1986) argue development of a universalistic theory encompassing the innovation process is difficult because of the inherent differences across innovation types; and so too may be the case in attaining a universally accepted definition. Similarly, development of innovation metrics also have similar difficulties assert Carayannis and Provance (2008) as they cite various measures and indicators which include: input indicators; process indicators; performance indicators; output indicators; outcome indicators; and, an impact measure (2008, p. 94). While there are innovation proxy measures available, a review of the extant literature revealed only a limited number of publications with measures and/or indicators suitable specifically for small business operations (Arundel & O'Brien, 2009).

Therefore, this thesis explores what factors enable innovation processes in the context of a regional small business sector; namely, North Queensland. For example, what are the activities, attitudes, routines, knowledge, expertise and adoption decisions - often referred to as the antecedents of innovation (Menon & Lukas, 2004; Peltier, Schibrowsky, & Yushan, 2009; Radas & Bozic, 2009) - that contribute to innovation processes which give rise to outputs and/or outcomes that create some form of value for

the business and its customers. Furthermore, while there remains certain levels of ambiguity pertaining to the construct definition of innovation (G. W. Downs & Mohr, 1979), there is unanimous certainty that the adoption of a wide range of innovation types will lead to value creation for the adopting business (Damanpour & Schneider, 2006, 2009; Dewar & Dutton, 1986). For example, the Australian Manufacturing Council is cited as confirming that all sources of innovation are used by Australian businesses to attain a competitive advantage (J. Weerawardena, 2003); while the author also posits that evidence shows businesses practice all forms of innovation in the pursuit of sustainability. In brief, this thesis does not focused on any one particular type of innovation, such as a new product or service, technological or administrative; it has explored all forms of innovation that not only create value for the business, but also help the business to build on its innovative capabilities. Thus, the thesis objective explores all aspects of innovation that make a contribution to the business, discussed next.

Aiming for answers The objective of the thesis is to ascertain if the adoption and adaptation of innovations promote the evolution of innovative capabilities. This objective encapsulates three primary aims: 1) to identify the enablers that drive innovation processes in small business environments; 2) to examine how these enablers can be interlinked to form a conceptual model and innovation planning framework; and, 3) to explore the development of metrics and/or indicators with the potential for measuring and/or predicting innovative capabilities within small business environments. In brief, research into the innovation process is generally regarded as complex and multifaceted, particularly in terms of developing specific measures to capture the dynamic range of innovation activities undertaken across different industry sectors. This issue is even more evident in the context of Australian regional small businesses which is sorely under-represented in the extant research literature; but first, some broader background to these research issues starting with a definition of innovative capabilities, discussed next.

Firstly, a brief definition of the innovative capability construct is given here; however, a more comprehensive definition is given in section 4.5.1 preceding the propositional inventory. The term capability is defined as (having the) power of, to do something, undeveloped or unused faculty. Therefore, when it is combined with the term

innovative, it is essentially the ability and/or capacity to do or produce something innovative; thus, in its most basic construct innovative capability could be defined as the capacity to innovate. Nonetheless, Siguaw, Simpson and Enz (2006) argue that innovative capability is more appropriately conceptualised as an innovation orientation. The authors argue the level of a business's innovative capabilities is actually equal to a business's specific level of competency involving three functional areas: 1) learning philosophy 2) strategic direction and 3) transfunctional acclimation. Each of these functional components combines to form a single systematic process of organisational competencies, discussed next.

When these functional areas are combined they form the basis of a systematic process called organisational competencies aimed at fostering innovation producing activity. According to Siguaw et al (2006), these competencies emerge from possessing internal knowledge capacity and a strong focus for innovation orientation. Learning philosophy is defined as a business's underlying attitude toward learning, acquiring and integrating knowledge which facilitates innovation. Strategic direction is defined as the activities and beliefs that drive the business towards future innovation goals. Transfunctional acclimation concerns embedding knowledge transfer throughout the entire business that fosters common beliefs and understanding about the importance of innovation while maintaining a diversity of views. The authors posit that the conceptualisation of the innovation inducing competencies is equivalent to dynamic capabilities; but once the three elements converge to form overall organisational competencies they contribute to a single system known as innovation orientation - which in this thesis is termed innovative capabilities. Next, the many various types of innovation present definitional difficulties as well, discussed next.

The difficulties of definition Of the multiple types of innovation described in the research literature, radical innovation is often closely associated with entrepreneurship. As the name implies, radical innovation involves major changes, high levels of risk taking, and products or services that are completely new and often disruptive. However, just as Schaper and Volery (2004) argue there is no agreed definition of entrepreneurship, the same applies with innovation. With radical and incremental innovation literally being at the opposite ends of a procedural continuum, limited consensus exists (Garcia & Calantone, 2002) of a concise definition of the innovation

construct in the wider research literature (Bhaskaran, 2006; Johannesson, Olsen, & Lumpkin, 2001; Olsen, Lee, & Hodgkinson, 2006; M. Rogers, 2004). Part of the reason for this uncertainty, according to Tidd et al. (1997), is the complexity surrounding innovation research generally. For example, the authors argue many of the resulting outputs from the two forms of innovation are difficult to measure intangibles, such as knowledge or experiential know-how. Further, Downs and Mohr (1979) assert researchers 'have allowed "innovation" to take on too many different meanings' (1979, p. 385) creating definitional ambiguity. Nonetheless, even though the two innovation types have different approaches, each process may potentially result in similar outcomes with identical outputs. The many variations attributed to the innovation construct, and the range of innovation typologies, make it hard to narrow down to a single unitary definition, discussed next.

One of the primary problems associated with trying to define the innovation construct the existence of so many varying definitions within the research literature. However, this definitional problem exists in step with the theoretical problem associated with innovation; whereby, the idea of a universalistic theory of the innovation process being developed has been rejected (Dewar & Dutton, 1986; G. W. Downs, Jr. & Mohr, 1976). For example, Downs and Mohr (G. W. Downs, Jr. & Mohr, 1976) assert that because of the existence of a multitude of innovation types it is impossible to develop one overarching unitary innovation theory; whereby, the widespread adoption of innovation needs correspondingly distinct theories to provide plausible explanation of the processes involved. Yet in later paper the same authors argue that 'too many different meanings' (G. W. Downs & Mohr, 1979, p. 385) attributed to innovation have created ambiguity; in addition to voluminous research findings on innovation theory development having created a 'disconcerting level of instability' (p. 380). Consequently, there are a multitude of different innovation typologies which include: administrative, technological, non-technological, organisational, radical and incremental (Damanpour, 1991; Garcia & Calantone, 2002; Gopalakrishnan & Bierly, 2001). Indeed, Garcia and Calantone (2002) argue the over-abundance of innovation typologies being developed has meant that researchers have classified the same type of innovations under different typologies, which simply creates more confusion and ambiguity (G. W. Downs & Mohr, 1979). This thesis will adopt a relatively simple

definition of innovation, and a research focus will only be on two identified types: radical and incremental. The reason for this simplified approach is discussed next.

It is obvious that innovation has been extensively researched, with volumes of research literature available and making an already complex research problem even more complex with many varying definitions, typologies, models and theories available. The approach by this thesis is to try and keep the research process as simple as possible, given that one of its underlying aims is for the findings to be user friendly for regional small business practitioners. There is also criticism in the research literature suggesting that innovation research is focused too narrowly on particular aspects of innovation, for example, using 'a single input or output indicator to determine innovative performance of the firm' (Carayannis & Provance, 2008). There is evidence available that many businesses use all different types of innovation to contribute to value creating activities and to create a sustained competitive advantage (J. Weerawardena, 2003). On this basis it was decided to focus on two types of innovation, radical and incremental, to encompass all the different types of innovation activity that occurred within regional small businesses. It is believed that radical and incremental innovation, distinguished as being the opposite ends of a theoretical continuum attributed to innovation inputs and outputs and linked to the levels of embedded knowledge within the business, provides an overarching distinction for the types of innovation activities and outputs which occur in regional small business environments. For example, a new management procedure introduced to the business could be completely new and disruptive, making a radical; or it could have been introduced and developed over time, making it incremental. But it is these differences and variations that make innovation activities and outputs so difficult to accurately measure in small business environments, discussed next.

A widely known idiom states: ‘You cannot manage something you cannot measure’, and so it is with innovation in the context of small businesses. Even though proxy measures for innovation are available, up until recently there was little general consensus on how small business innovation can be reliably, or accurately, measured (Becheikh, et al., 2006; Bhattacharya & Bloch, 2004; M. Rogers, 1998). For instance, the main innovation measures developed rely on application of proxy measures (Dodgson, 2000). These proxy measures were developed for, and tend to focus on, medium-to-large businesses (Carayannis & Provance, 2008), therefore, are not readily or easily transferable into the small business environment (Glenn & Weerawardena,

1996; Hausman, 2005). Examples of such proxy measures include: research and development (R&D) expenditure (Dodgson & Hinze, 2001; Mets, 2006); patent and trademark registrations (M. Rogers, 2010); and the formation of collaborative partnerships and networks (Franco-Santos & Bourne, 2005; Hipp & Grupp, 2005; Hyland & Beckett, 2005). Moreover, anecdotal evidence suggests that many small businesses, particularly the retail sector (Tidd, et al., 1997), do not or could not afford to engage in formal R&D practices and patent applications; thereby, the proxy measures are rendered non-applicable and unreliable (Jensen & Webster, 2004). However, a recent publication, *Innovation Metrics for Australia*, from the Australian Innovation Research Centre in Tasmania has made a significant contribution to the development of innovation measure and indicators which can be applied to the small business sector (Arundel & O'Brien, 2009). In brief, the uncertainty surrounding the measurement of innovation capabilities in regional small businesses is a significant research problem. Furthermore, additional influential factors contribute to the complexity of innovation, discussed next.

Innovation influences Numerous influential factors are identified within the extant research literature which contribute to innovation processes and help build innovative capabilities. Such factors add to the complexity of innovation research; subsequently, a number of them are included within the scope of this thesis. These influential factors include: the importance attributed to collaboration and networking (L. Pittaway, Robertson, Munir, Denyer, & Neely, 2004; Romijn & Albu, 2002); knowledge management and technological spillover effects (Breschi & Lissoni, 2001; C. Gray, 2006; Mets, 2006; Moodysson & Jonsson, 2007); training and education effects (Johnston, Hamilton, & Zhang, 2008; J. T. Jones, 2005); organisational structure and culture (Hyland & Beckett, 2005; Russell, 1989); strategic and marketing orientation (Kara, Spillan, & DeShields, 2005; J. Kickul & L. K. Gundry, 2002); adoption rate timeframes for new products and processes (Damanpour, 1991; Dewar & Dutton, 1986; Frambach & Schillewaert, 2002; Premkumar & Roberts, 1999; Ramdani, Kawalek, & Lorenzo, 2009); and how businesses can improve their innovation capacity (Romijn & Albaladejo, 2002). Another factor that drives small business innovation is the basic necessity of solving problems with available resources, an issue concerning resource limitations (Brush & Chaganti, 1999; Rothwell & Zegveld, 1982). In brief, small business innovation research is challenging because of the wide scope of complex

issues, activities, processes and procedures that constitute the overall innovation process; thereby, this thesis has tried to explore as many factors as possible.

In summary, innovation is an extremely complex, interrelated, and hard-to-measure research problem. Indeed, given the importance of the small business sector to a nation's economic, employment and social well-being, it is surely a research topic deserving greater prominence. The levels of uncertainty, ambiguity and lack of understanding associated with the definition and measurement of small business innovation may potentially contribute to the continuing high failure rate of Australian small businesses (Baard & Watts, 2007). For example, data analysed by Dun and Bradstreet (Anon, 2011) indicates small businesses accounted for the most significant number of business failures in 2010, with the failure of micro businesses (1–4 employees) increasing by 46 per cent year-on-year. Consequently, this thesis has taken an evidence-based approach to the research problem. The first aim is to identify the enablers that drive innovation processes within small business environments. The second aim is to use these innovation enablers for the development of a conceptual model and innovation planning framework specific to the sector. The third and final aim is to explore the construction of a range of metrics and/or predictive indicators with potential for measuring a business's level of innovative capability; which in turn, could be indicative of their capacity for high levels of innovation outputs. Next, an overview of the innovation research background is discussed.

1.2 INNOVATION RESEARCH OVERVIEW

Innovation research gained prominence in the 1930s when Austrian economist, Joseph A. Schumpeter, penned the construct 'Innovation is the commercialisation of inventions'. Since that time there has been exponential growth in innovation-related research resulting in substantial volumes of research studies, reports and textbooks. For example, Everett M. Rogers in his book *Diffusion of Innovations*, details how his first edition published in 1962 referenced 405 publications; whereas, the 2003 fifth edition now has more than 5,200 referenced publications. Furthermore, when the search string 'small business AND innovation' is entered into the Google Scholar search engine, in excess of 408,000 hits are found; albeit, not all these would be focused specifically on small business innovation. Nonetheless, even with such volumes of research related to the various facets of innovation research, it is suggested there remains a relative paucity

of empirical research specifically focused on small business innovation (Hausman, 2005; S. Laforet, 2009; Prajogo, et al., 2013); particularly from an Australian perspective (Bhattacharya & Bloch, 2004). Therefore, this thesis makes a substantive contribution to the empirical research literature in the context of Australian small business innovation. However, innovation is not the exclusive domain of business, as E. Rogers' research in the late 1950s and early 1960s into agriculture innovation demonstrates. Innovation covers numerous industry sectors, education, medicine and government institutions, discussed next.

Innovation research covers a wide breadth of industry sectors, government institutions and academic disciplines. There are numerous publications related to innovation research that have no links to business per se, such as innovative policy adoption rates in American states (Eyestone, 1977), and education on how to become an innovative university lecturer (Cowan, 1998). However, as the business world moves into what Pilzer (2006) describes as the 'Information Age', building and sustaining a competitive advantage through innovation is often espoused as paramount for business growth and survival today (Tidd, et al., 1997). For example, headlines assert: 'Innovate or Perish' (Robertson, 1967; Ruthven, 2005, p. 52), or as management guru Peter Drucker wrote: 'And in such a period of rapid change the best – perhaps the only – way a business can hope to prosper, if not to survive, is to innovate' (1994, p. ix). Nevertheless, using Schumpeter's original definition one could assume innovation is actually a linear process, or a set of procedures, geared towards the culmination of an invention being commercialised. Yet as the research literature clearly demonstrates, innovation is not a simple linear process; indeed, innovating may not even result in a tangible output. Further, Schumpeter also contends that technological advancement acts as a catalyst for innovation while simultaneously causing the 'creative destruction' of obsolete technologies, discussed next.

New replacing the old The concept of creative destruction is intrinsically linked to the innovation process; whereby, the old is replaced by the new. An important point to note, however, is that technology is not simply about the art of mechanics and science, but it is an all-encompassing term which includes such aspects as management processes and marketing activities (Dodgson, 2000). Moreover, the simple idiom 'Necessity is the mother of invention' is also a key driver of innovation, which Tidd et

al. defines as the ‘need pull’ approach (1997, p. 29). This approach is described as a situation where new processes or technologies are developed, or invented, to solve existing problems. Alternatively, the constantly evolving process of creative destruction is what Rothwell (1994) categorised as a ‘technology push’ when referring to the changing sources driving the innovation process. Indeed, Dodgson (2000) argues an invention by itself holds no intrinsic value for the inventor if it cannot be commercialised; however, improvements in management technology still provide some form of value proposition to the business through improved procedural efficiencies, productivity, and organisational culture (Garcia & Calantone, 2002). Thus, Schumpeter’s construct of new inventions being intrinsically linked with creative destruction appears to discount the creation of new knowledge, expertise and increased innovative capabilities; important factors for driving future innovation. For instance, ‘...technological innovation is now the most important driver of competitive success’ (Schilling, 2005, p. 1); but as the research literature shows innovation is not just about inventions, discussed next.

Schumpeter (1947) asserts that an invention is distinct from innovation. Essentially, he contends entrepreneurism is what pushes innovation by suggesting: ‘The inventor produces ideas, the entrepreneur gets things done’ (Schumpeter, 1947, p. 152). Accepting that an idea or invention is the embryo of the innovation process, and that technological development is the catalyst, what other factors drive the innovation process in small businesses? The research literature covers, for example, such factorial drivers as: entrepreneurship and start-ups; forming collaborative partnerships and alliances; developing industry clusters and networks; conducting environmental scanning; constructing knowledge management procedures; nurturing an internal innovation culture; absorptive capacity; and training and skills development. Furthermore, a widely supported perception is that technology will continue to drive innovation exponentially (White & Bruton, 2007); whereby, future managerial processes will require continual incremental development to cater for evolving technologies within the business’s own operating environment (Tidd, et al., 1997). In brief, a proactive approach to managerial and technological development is essential for building a repository of knowledge, expertise and innovative capabilities to drive small business innovation; in contrast to simply inventing and commercialising new products or services. Next, innovation research in Australia is discussed.

1.2.1 An Australian perspective

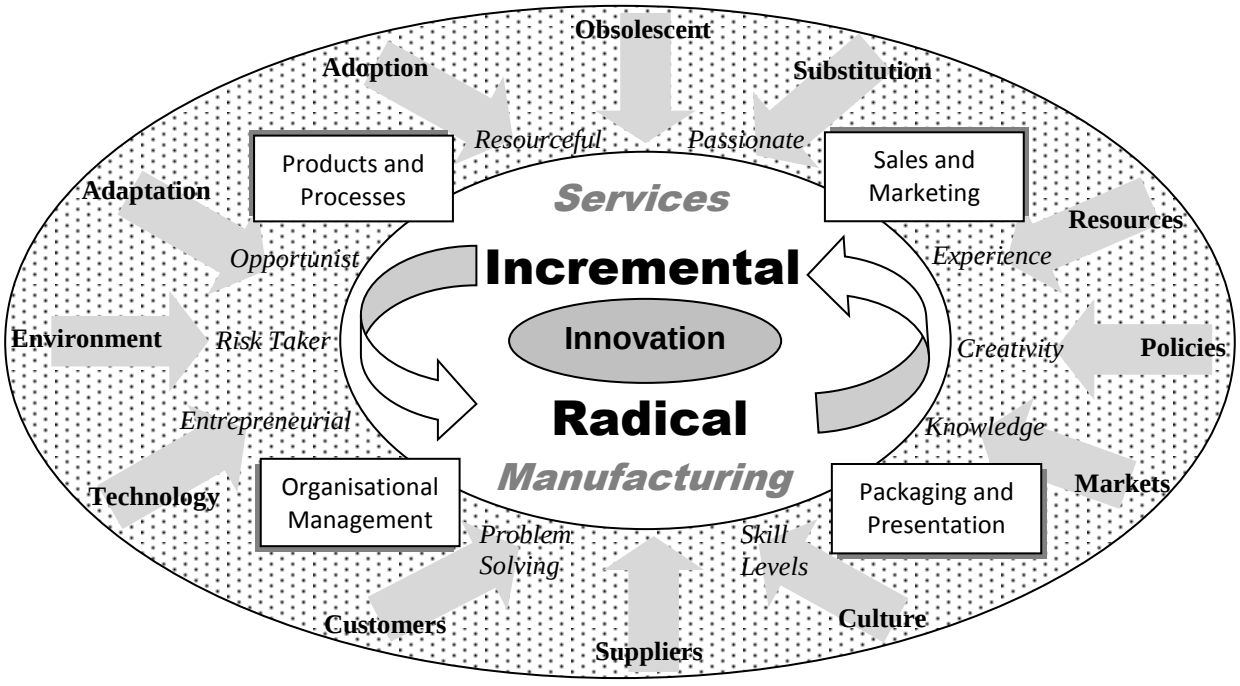
Historically, Australia was geographically isolated from the rest of the developed industrialised nations. Australian ingenuity and inventiveness developed as a way to combat the factors of distance, isolation and a small population. Indeed, necessity was the driving force behind many of the inventions and innovations that helped the nation overcome this geographic isolation. Anecdotal evidence suggests inventions such as the stump-jump plough, the rotary hoe and the Victa lawn mower were developed to solve specific agricultural problems. For example, an adaptation from James Harrison introduced vapour-compression refrigeration into the Australian brewing and meat packing industries in 1857, even though he was not the original inventor of the refrigeration process. Importantly, Harrison's adaptation typifies how original inventions were often modified to provide a solution for problems other than what the original invention was developed for. And herein is one of the underlying problems of innovation research in Australia: does an innovation need to be completely new and, if so, new to whom, and how new (Johannesson, et al., 2001)? The debate about newness creates ambiguity in innovation research unless one takes a broader approach and incorporates aspects such as adoption and reinvention processes (E. Rogers, 2003), issues discussed later in the thesis. In brief, Australia as a nation has proved itself to be highly innovative necessitated by its geographic isolation; in part due to local ingenuity of adoption and adaptation of existing inventions aimed towards problem-solving. Next, a short summary of other influencing factors which drive innovation identified from the literature is presented.

1.2.2 Additional literature themes

In addition to the influencing factors driving innovation already discussed, many other key themes emerged during the research literature review. A schematic summary of the main internal and external drivers and processes identified from the literature has been detailed in Figure 1.1. A more comprehensive examination of the various influences, processes, procedures and activities that emerged from the literature review is presented in chapter 2. The causal map of innovation in Figure 1.1 illustrates that innovation can take two forms, radical or incremental (Dodgson, 2000), and is often a combination of both. According to the *Oslo Manual: Guidelines for collecting and interpreting innovation data* (OECD/Eurostat, 2005), many identified variables that are both influenced by, and exert influence upon, innovation activities include: management

procedures and organisational structure; sales and marketing processes; packaging and presentation formats; and of course the products, production techniques and R&D processes a business used. However, as with similar constructs with complex interconnected relationships there are many other influential factors that contribute to innovation activities, discussed next.

Professor Roy Green contends innovation is comprised of three main elements – technological, organisational and institutional factors(2006). Whereas, Dodgson (2000) posits that effective management of innovation research and development is extremely important, especially in terms of technological R&D. Additional influences include customer driven innovation (von Hipple, 1988, 2006) and supplier collaboration; consequently, the causal map was used to visually represent the innovation process with all its various complexities.



Key to outer ellipse terms: Bold - External factor influence
Italics - Personal attribute influence

Figure 1.1 **Causal map of external/internal factors of the innovation process**

Aspects such as R&D are encompassed by several influencing factors including resources availability, organisational culture, and governmental and industry regulatory policies. Nevertheless, considerable debate remains about the various influencing elements contained within the two main types of innovation identified: radical and incremental, discussed next.

Innovation types One contentious issue vigorously debated by both academics and practitioners alike, surrounds the constructs of radical versus incremental innovation. Radical innovation refers to something that is completely new to the market (Maine, Probert, & Ashby, 2005). Alternatively, incremental innovation is about continuous, yet gradual, improvements implemented in small manageable steps (Bhaskaran, 2006); a process not dissimilar to Quinn's (1994) construct of Logical Incrementalism or the Deming Cycle (J. R. Evans & Lindsay, 1999). Nonetheless, little empirical evidence exists about which specific processes and activities are exclusive, if at all, in constituting each form of innovation; and nor is there any evidence of which processes and activities work best. However, there is general acceptance that incremental innovation is more strongly aligned to the services sector (J. de Jong & Vermeulen, 2003; Hipp & Grupp, 2005); in addition to wide acceptance that the two types sit at the opposite ends of an innovation continuum (Dewar & Dutton, 1986). There are also other typologies of identified that include administrative, organisational, technical and non-technical for example. The one overarching theme to gain universal acceptance within the research literature is that innovation is cross-sectional and multidimensional. For example, both incremental and radical innovation can be involved in a single output; whereby, continuous development, refinement and testing can result in a completely new product or service being produced. Additionally, both types of innovation can be prevalent in the services or manufacturing sectors at the same time.

Attitudes towards risk taking and searching for opportunities are two further influential factors associated with driving innovation. For example, many innovation pursuits have a certain element of risk associated with them (Drucker, 1994), particularly where aiming to capitalise on new opportunities. Alternatively, a barrier to innovation for a risk-averse firm is to maintain a culture that engenders an unwillingness to make mistakes by either punishing, or at least dissuading, employees from experimenting with new ideas, processes and product development (Hyland & Beckett, 2005; McGrath & MacMillan, 2000). Research conducted within the grey and industry literature, for example, strongly supports giving employees greater autonomy or empowerment, involvement with decision-making processes, and the opportunity to participate in the research and development process, elements which assist to increase the overall innovativeness of the business (Birchall, 2012). The ability to confidently assess risk,

and thereby to take advantage of emerging opportunities, is one way to develop an organisational culture naturally attuned towards innovation, discussed next.

Risk versus opportunity Entrepreneurship researcher Peter Drucker (1994) contends that risk taking and opportunity exploitation are intrinsically linked. However, Drucker argues that risk assessment is not the critical issue — being able to identify potential opportunities which the business can capitalise on through innovative products or services is most important. For example, numerous business opportunities accompany change in the context of technological and social change, thus he argues:

> Systematic innovation therefore consists in the purposeful and organised search for changes, and in the systematic analysis of the opportunities such change might offer for economic or social innovation…The overwhelming majority of successful innovations exploit change (Drucker, 1994, p. 31).

Indeed, a business operator's attitude towards risk aversion, measured using an attitudinal Likert scale, could be developed as a potential proxy indicator for assessing their orientation towards becoming more innovative — a form of psychometric testing. Nonetheless, risk assessment and opportunity identification are not inherent attributes that all people possess, but they are attributes that can be learnt over time through experience. Fostering a learning environment within the business helps develop skills for evaluating risk and identifying opportunities; thereby, assisting with the development of an internal innovative culture, discussed next.

Providing an environment conducive to learning is extremely important to nurturing an innovation culture within a business (Cohen & Levinthal, 1990; C. Gray, 2006). While this issue is discussed in more detail in chapter 2, several of the activities and procedures required to nurture this type of environment include:

- risk assessment and evaluation;
- acquisition and integration of external knowledge;
- customer needs identification and end-user input;
- 360 degree employee feedback without fear of retribution; and,
- mistakes and failures accepted as an integral function of learning.

When combined, these procedures and activities assist to develop a culture that yields substantial improvements in innovative outputs, a process Cohen and Levinthal (1990) refer to as absorptive capacity. Nonetheless, there is little empirical evidence supporting one 'best practice' to pursue a learning strategy focused on innovation. Indeed, the strategy and method(s) selected will be determined by the environmental context in which the business itself operates. In brief, focusing on the development of absorptive capacity, particularly in the areas of risk assessment and opportunity identification, helps increase a business's innovative capabilities.

In summary, there are many inter-related and multidimensional themes related to innovation research. A small sample covers such themes as: risk aversion attitudes (Bhaskaran, 2006; Livesay, Lux, & Brown, 1996); end-user and customer adaptations (von Hipple, 1988); technological advancements (Drazin & Schoonhoven, 1996); technological spillover effects (Cameron, 1998; Olsen, et al., 2006); diffusion and adoption rates (Lee & Runge, 2001; Premkumar & Roberts, 1999; E. Rogers, 2003); and organisational structures and management culture (Hyland & Beckett, 2005). However, trying to encompass all these themes in one investigation is beyond the scope of this thesis; therefore, the relative determinants and drivers — hereafter referred to as enablers — of regional small business innovation activities are what this thesis aims to identify.

1.3 THE RESEARCH PROBLEM

The crucial first step in effective research is to correctly identify what the research problem is — often referred to as the 'broad problem area' (Sekaran, 1992, p. 31). This step enables the researcher(s) to construct a conceptual framework and formulate a research design of how the research is to be conducted; ascertain and plan the literature to be reviewed; and finally, decide the appropriate data to collect (Sekaran, 1992). Moreover, Babbie (2002) contends that answering the simple questions of the who, what, where, how, and why concerned with the chosen topic will enable the researcher to frame the research problem and design within the context of applicable boundaries. Using this approach helped identify the broad research problem area in the following way:

- Who - small business operators;
- What - what activities, procedures and processes help build innovative capacity;

- Where - regional North Queensland;
- How – use semi-structured, in-depth interviews to collect primary data;
- Why - to understand how small businesses innovate.

By applying these basic questions, the following research problem was identified:

What are the enablers (processes, products, procedures, ideas, knowledge and attitudes) of innovation activities within the context of Australian regional small business environments; moreover, once identified, how can these innovation enablers be interlinked to form measures or indicators capable of measuring a business's level of innovative capabilities?

Hence, as a result of identifying the broad research problem area, the primary objective of this thesis is encapsulated by three primary aims.

1. **To identify the enablers that drive innovation activities in Australian regional small business environments.**

Achievement of this aim will allow small business operators and researchers to be aware of, and therefore focus on, the various activities and procedures that contribute to innovation processes in small business environments.

2. **To examine how these enablers can be interlinked to form a conceptual model and innovation planning framework contextually specific for regional small businesses.**

Achievement of this aim would encourage more effective planning and development procedures; which in turn, should lead to better management of an overarching innovation strategy in small business environments.

3. **To explore the development of composite metrics with the potential capacity for measuring and/or predicting innovative capabilities within regional small business environments.**

The outcome from such an explorative exercise is to propose measures and/or indicators capable of measuring, or at least identifying, a business's level of innovative capability. In turn, such measures or indicators may consistently predict a business's propensity for

high levels of innovative outcomes and outputs. Such information would facilitate the development of an overarching innovation management strategy to more efficiently and effectively operate and manage those small businesses identified as having high level innovative capabilities. Moreover, an anticipated outcome from identifying potential innovative capability measures and/or predictive indicators would provide the foundations for development of an innovation measurement framework specific for small businesses. The objective of such a framework should be to accurately measure, or consistently predict, innovation process outcomes and outputs in small business environments, something which is currently unavailable.

Innovation is important to all levels of business, yet difficult to measure in the context of small business (Dodgson & Hinze, 2001; Jensen & Webster, 2004; M. Rogers, 1998). Moreover, small businesses are inherently innovative due to their flexibility and ability to quickly adapt to changing circumstances (Hausman, 2005). Nonetheless, Rothwell (1989) summarised that: 'Innovatory advantage is unequivocally associated with neither large nor small firms' (p. 52). Additionally, Rothwell and Zegveld (1982) describe a number of inherent disadvantages faced by small businesses in developing innovative capabilities that include: lack of cash; lack of qualified manpower resources, and; the inability to obtain economies of scale. Anecdotal evidence suggests that two-thirds of small businesses fail within the first five years of operation (Schaper, 2006). The literature review uncovered numerous innovation models, frameworks, and proxy measures developed for the effective management and measurement of innovation processes. Albeit, the majority of measures and models were developed for large-scale businesses (Keskin, 2006; S. Laforet, 2009), and according to Carayannis and Provance (2008) innovation is still extremely difficult to measure due to the complex dynamics involved in its constituent components. Subsequently, many of the innovation models and measures fail to be transferable, or even applicable, to small business environments (M. Rogers, 1999); particularly in the context of regional small businesses. Thus, exploration into developing metrics or predictive indicators for identifying and measuring innovative capability levels of small businesses is important for the sector generally, discussed next.

While the actual innovation process may be extremely difficult to measure, identifying and measuring levels of innovative capability may prove to be less difficult. The term

capability is defined as the power to do something, a latent capacity to produce or of being capable of producing. According to Zahra and George (2002) in their reconceptualisation of the absorptive capacity construct (Cohen & Levinthal, 1990), there exist various dimensions of capabilities which fall into two distinguishable subsets. The first capability subset involves activities or entrenched routines that provide decision options towards ensuring production of outputs that are contingent to a business's survival. The second subset involves dynamic capabilities which contribute to, and facilitate, change in a strategic sense. The author's posit that dynamic capabilities act to guide the business's direction towards a pathway of evolution and development based on four key organisational capabilities; knowledge acquisition, assimilation, transformation and exploitation. They argue that each of these capabilities 'build on each other to yield absorptive capacity (ACAP)' (Zahra & George, 2002, p. 188); thereby, enabling the business to acquire and utilise knowledge essential to nurture, and further develop, additional organisational capabilities. In brief, by identifying routine activities and procedures deemed to be associated to these four key organisational capabilities, it may be possible to construct composite metrics or indicators capable of potentially measuring, or at least predicting, a business's levels of innovative capabilities. In order to get answers to any problems one must have a set of questions, which are discussed next.

1.3.1 The research questions

As discussed previously, innovation takes many forms covering a broad range of industries and research disciplines. It has been variously described as: an economic driver (Schumpeter, 1934); an antidote to business and technological stagnation (Solow, 1957); and the catalyst for sustainable competitive advantage (Porter, 1990). However, the scope of this thesis was kept narrow and focuses on the two-part research problem identified from the research literature. To reiterate, the first is the lack of identified enablers which drive innovation activities in the context of small business environments (Olsen, et al., 2006; M. Rogers, 1998); particularly from a regional Australia perspective. The second is the inability to accurately measure innovation activities and outputs within small business operations (Z. J Acs & Audretsch, 1990; Becheikh, et al., 2006; Dodgson & Hinze, 2001; Jensen & Webster, 2004). Thus, the following research questions were developed:

Q1: What are the enabling factors (processes, products, procedures, ideas, knowledge and attitudes) that drive innovative activities?

Q2: Which of these enablers demonstrate capacity to help a business build innovative capabilities?

Q3: How can these enablers be interlinked to form a conceptual model and innovation planning framework?

Q4: Which of these enablers could be incorporated to form composite metrics with the capacity to measure or predict levels of innovative capability?

Importantly, justification for developing a planning framework and predictive indicators is quite rudimentary. Firstly, frameworks are an evolutionary process which allow for continual updating when new findings become available. For example, Milbergs (2004) described them as 'inherently dynamic and constantly evolving…the framework will always be a work in progress. No framework can be definitive and final' (p. 6). Furthermore, the construction of predictive indicators is necessary should the innovation enablers identified not be applicable as measures of innovative capabilities by themselves (Georgellis, Joyce, & Woods, 2000). It may require a composite of several enablers to form one predictive indicator. Indeed, indicators are so called because they are only indirect measures of mostly intangible factors (J. R. Evans & Lindsay, 1999); thus, indicators are used to predict potential outcomes associated with certain actions, procedures or activities. Intangibles such as intellectual capital, creativity and tacit knowledge, important components of innovative capability, are always going to be difficult to measure (Becheikh, et al., 2006). Further justification of the research questions, and their objectives, is discussed next.

1.4 RESEARCH JUSTIFICATION

Innovation research findings over eight decades demonstrate it is a very complex and multidimensional construct. It is apparent there is limited consensus as to how innovation might be defined in particular contextual settings, what factors and elements constitute the overall process, and how it might be accurately measured in terms of process outputs or adoption rates. Consequently, herein lays the fundamental problem when broaching the research problem given so much research has been undertaken previously: how much of the previous research is contextually specific to small business

operations? This section provides an overview for the justification of this thesis topic, including the importance of the small business sector to the national economy.

Fundamentally, it is the lack of generalised consensus surrounding innovation definition and procedural approaches that led to formulation of the research problem. For example, in the context of small business operations specifically there is a relative paucity of empirical research evidence available (Hausman, 2005), particularly in the context of regional small businesses (R McAdam, McConvery, & Armstrong, 2004). The lack of clear universally accepted definitions, a multitude of procedural activities lacking consensus, and general scarcity of focused small business research, provides the main justification for this thesis. However, additional small business knowledge gaps in the research literature highlighted a number of other lesser, yet still significant, problems adding to the complicated nature of innovation research, discussed next.

Research difficulties The literature review revealed additional inherent problems, and entrenched inconsistencies, associated with the research of innovation (Z. J Acs & Audretsch, 1990; Olsen, et al., 2006; M. Rogers, 1998). For example, small businesses are renowned for poor record-keeping and limited documentation concerned with financial records (Georgellis, et al., 2000), particularly those related to R&D expenditure; thereby, preventing accurate comparison of R&D expenditure levels as a proxy measure and/or indicator of investment in innovation. Further, the scope of contemporary innovation research continues to widen with the advent of network-connected, globalised markets perpetuated by the Internet's virtual shopfront. Consequently, a range of knowledge gaps exist relative to small business innovation research that requires further clarification, which includes:

- What communication channels are best suited for the most effective and far-reaching dissemination of new innovation developments?
- What levels of education are most appropriate for the main decision makers involved in innovation development or adoption?
- Are higher education levels an important factor in the development and adoption rates of innovation?
- What are the most relevant factors to be considered in the innovation adoption process?

- What levels, or forms, of reinvention can be undertaken of a current innovation during the adoption process before it mutates to a completely 'new' innovation?
- Can a business be classed as an innovator if they simply adopt innovations developed by other businesses?

In brief, the justification for this thesis is based on three primary issues contextually specific to small business operations: (1) a lack of a clear, universally accepted, definition pertaining to the innovation construct (E. Rogers, 2003); (2) the paucity of empirical research focused on Australian small businesses (Bhattacharya & Bloch, 2004), particularly from a regional context; and, (3) the need for a broad-based small business innovation measurement framework (Otero-Neira, Lindman, & Fernandez, 2009). Next, the variations attributed to the definition of small business is discussed.

1.5 DEFINITIONS OF SMALL BUSINESS

The vast majority of large businesses originally start as a small business. The overall importance of the small business sector to a country's economy is demonstrated in a study by McAdam, McConvery and Armstrong (2004). The authors report how the Northern Ireland economy is sustained by an overwhelming majority of small businesses; whereby, 76 per cent are single/micro businesses (1-9 employees), and 99.8 per cent of businesses are classified as SMEs accounting for 85 per cent of total private sector employment. Moreover, small business is described as the virtual engine room, or lifeblood, of a country's economy (Parker, 2000). The sector drives private job growth and makes significant contributions to a country's national gross domestic product (Beaver, 2002; Morrison, Breen, & Shameem, 2003); while also making valuable contributions to export earnings. Nevertheless, there are difficulties in trying to synthesise small business research findings because, as Beaver (2002) states: 'Small firms are much easier to describe than to define and to this day there is no generally agreed operational or numerical definitions of what constitutes a small business' (p. 2). It is this disparity between different country's definitions applied to small business that creates difficulties in interpreting research findings, discussed next.

There has been much empirical research undertaken on the effects of business size and innovation capabilities, or their capacity to innovate (Z. J Acs & Audretsch, 1990, 1988 #371; S. Laforet, 2009, 2006 #750; Prajogo, et al., 2013). Nonetheless, significant disparities exist concerning the definition of what constitutes a small business in terms

of structure and employee numbers; the result of which means directly comparing findings purporting to study small business is often difficult. For example, Prajogo et al (2013) notes small and medium enterprises (SMEs) are defined in Europe as having less than 250 employees, or less than 500 in the United States. Alternatively, Laforet (2009) reports on recent research that defines small businesses as having less than 20 employees, intermediate or medium businesses having between 20-49 employees and large businesses as more than 50 employees. Further complicating this issue is that sole operators and two-person partnerships, part of what is known as the micro-business (1-4 employees) sector account for 67.5 per cent of the small business sector in Australia (Wang, Walker, Redmond, & Breen, 2008). An assumption could be made that how a sole operator pursues innovation would vary significantly to a business with 45 employees; not least because of the facts concerning resource constraints attributed to human capital and finances. Thus, one of the important gaps identified in the innovation literature is the dearth of empirical research specifically focused on the small business sector in Australia, particularly in the context of regional businesses. In brief, making comparisons between innovation research findings on small businesses is difficult due to the varying definitions applied to the sector throughout the world; hence, this thesis adopts a simple definition of small business, discussed next.

The Australian Bureau of Statistics (ABS) defines a small business as having less than 20 employees; whereas, small manufacturing businesses are classified as having up to 100 employees (ABS, 2003). According to the Commonwealth Department of Innovation, Industry, Science and Research there were approximately 2.05 million actively trading businesses in Australia as at June 2009. Of these, approximately 1.96 million, or around 96 per cent, were classified as small businesses (M. Clark, Eaton, Lind, Pye, & Bateman, 2011). For the purpose of this thesis, only businesses with less than 20 employees are included in the primary data sample.

Valuable contribution Australian small businesses employ 47.2 per cent of the private sector workforce, providing employment for approximately 4.8 million workers. Furthermore, during the 2009–10 financial year the sector contributed approximately 35 per cent of industry value added to the Australian economy, with more than 85 per cent of this contribution coming from service industry businesses (M. Clark, et al., 2011). Indeed, it is demonstrably clear this sector is extremely important to the national economy and employment market, yet empirical evidence is lacking about what are the

actual enablers that drive small business innovation activities and related procedures (Bhaskaran, 2006). Therefore, this thesis aims to produce relevant and useable findings to assist regional small business operators in two ways: 1) develop methods to effectively manage innovation activities;2) propose measures and/or indicators with the potential to measure, or at least identify, businesses with high levels of innovative capability.

1.6 RESEARCH DESIGN AND METHODOLOGY

This section provides a brief introduction of the research design and methodological approach used for this thesis; however, the entire process is detailed in chapter 3. A multi-methods approach was employed with two distinct stages. The first stage focused on the use of a systematic literature review (SLR) of the innovation research literature. The SLR process is described as a 'defined and methodical way to identify, assess and analyse published primary studies in order to investigate a specific research question' (Staples & Niazi, 2007, p. 62). Further, preliminary analysis was conducted on secondary data from the ABS Innovation Australian Businesses Survey 2003 (IABS 2003). The second stage, using information obtained from Stage 1, was the development and implementation of a survey questionnaire for an exploratory study collecting primary data on innovation procedures and activities in small businesses. The following points provide an overview of the processes involved:

- The typology of research was inductive, and involved an exploratory, or correlational, study design based on theory building;
- Combined research paradigms were applied by incorporating an innovative constructivism and pragmatic pluralism approach;
- An SLR provided a comprehensive, evidence-based, overview of the small business innovation research background;
- Initial secondary data was obtained through data mining and analysis of the ABS Innovation in Australian Business Survey 2003*;*
- Multi-methods research design was employed;
- Development and testing of a survey questionnaire instrument was undertaken for the collection of primary data;
- Implementation of survey was conducted using semi-structured, in-depth interviews;

- Sample selection procedures used a combination of systematic and judgemental sampling procedures to form a purposive sample technique;
- Multivariate data analysis techniques were applied to primary data sample.

In brief, the research undertaken for the thesis was a form of correlational study (C. D. Gray & Kinnear, 2012) that focused on complex interconnected relationships between processes and procedures that enable innovation activities to occur in regional small business environments.

1.6.1 Outline of the thesis structure

This section guides the reader through the thesis by describing the content structure of the chapters. The flowchart in Figure 1.2 provides a simplified overview of the thesis contents, which is then supported by further detail in each chapter section.

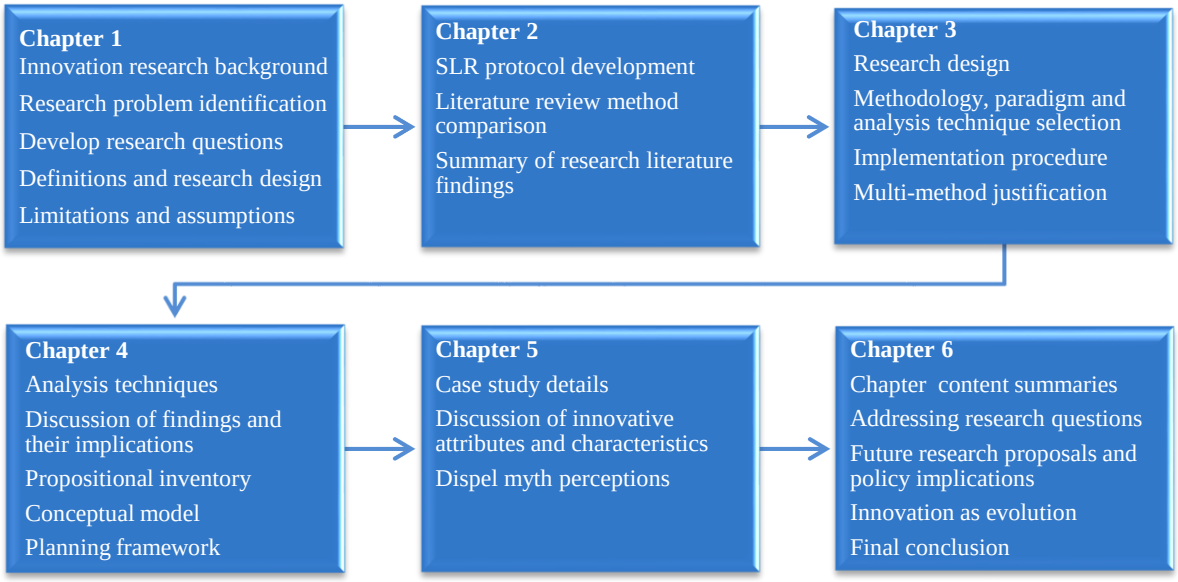


Figure 1.2 **Thesis structure flowchartChapter 2: Literature review**

- Justification for the use of the SLR methodology compared with a traditional narrative literature review.
- A detailed explanation of the required protocol development.
- An evaluated summary of the extant innovation research literature reviewed utilising the SLR process.
- Knowledge gaps in the literature are identified and discussed.

- Discussion on what are considered the main innovation influences, theories, models, and associated research problems.
- Finally, as an addendum for chapter 2, summary tables in an Appendix provides an easy-to-use reference system of the research papers reviewed during the SLR process.

Chapter 3: Methodology

- Describes why the research is deemed correlational research, defined by Gray and Kinnear (2012) as a research process that measures the variables under investigation as they actually occur in the environments, and individuals, being studied.
- Explains how the research design is built from a process similar to grounded theory, a construct first coined by Glaser and Strauss (1967) concerned with collecting and analysing data from within user environments, and using the findings to develop a theory.
- The selection of paradigms, which Babbie (2002) describes as the fundamental guidelines, or world-view, researchers use to coordinate observations for the purpose of formulating their reasoning. Subsequently, two paradigms, pragmatic pluralism and innovative constructivism, are combined for development of the research design.
- The application of an SLR process is employed to provide what Tranfield, Denyer and Smart (2003) describe as an evidence-informed approach into the research area being studied.
- Discussion and justification for the application of a multi-methods approach.
- The preparation and testing of a pre-coded questionnaire used as the survey instrument.
- The use of semi-structured, in-depth, face-to-face interviews for collection of the primary data sample.
- Describes how the purposive sampling method was used, where screening questions were asked to qualify appropriate respondents, and how the sample size was calculated.
- Because of the complex, non-linear nature of innovation, a detailed discussion of why the primary data sample required a similarly complex analytical approach. Analysis involved a series of mostly non-parametric, multivariate analysis techniques applied using SPSS statistics package.

- Lastly, justifies inclusion of three case studies that typifies the range of innovative activities and personal approaches used by small business to build and maintain high levels of innovative capability.

Chapter 4: Analysis, results and discussion

- Presents a short summary of the IABS 2003 secondary data analysis.
- Presents results and discusses findings from the primary data sample.
- Discusses the identified patterns emerging from the primary data sample findings.
- Discusses the development of the thesis outputs:
    - a propositional inventory;
    - a conceptual model;
    - proposed innovative capabilities measure and predictive indicators; and,
    - an innovation planning framework.

Chapter 5: Case studies

- Justifies the inclusion of case studies, which Babbie (2002) contends provide research evidence through an in-depth examination of representative examples of the social phenomena being studied.
- Examines the activities of a couple who operate a tourist park that demonstrated high levels of marketing orientation, continually introducing novel marketing activities, with high levels of customer and community engagement.
- Examines the activities of a wholesale/retail merchant who demonstrated strong entrepreneurial characteristics, identifies emerging opportunities and capitalises on them, and engages in continual product R&D.
- Lastly, examines the activities of a manufacturer/service provider who also demonstrated high levels of entrepreneurship having started several businesses. He proactively invents solutions to solve everyday problems; thereby, creating new markets for his products and services, and was the only business in the sample to have registered a patent in the previous 12 month period.

Chapter 6: Conclusion

- Provides a brief summary of the previous chapters.
- Presents the overall findings relative to the research problem by answering the four research questions.
- Discusses the implications arising from the findings in terms of:

- their importance to small business operators;
- future government policy direction;
- making a contribution towards tertiary business course development; and,
- future theoretical modelling development.

- Finally, future research avenues are proposed, including a longitudinal study.

1.7 DEFINITIONS

The modern conceptual definition of innovation is not new, as the etymology for the word originates from the Latin term *ínnovare*, meaning to make something new (Tidd, et al., 1997). However, even though innovation has been extensively researched and discussed across a wide spectrum of disciplines and industries, management researchers appear no closer to reaching general consensus on defining innovation in the context of business operations. Hence, this section discusses the difficulties concerned with the definition of innovation, and concludes with the definition adopted for this thesis.

One complex aspect underpinning the definition of innovation in the context of business operations concerns the term 'new'. Debate remains about what constitutes an innovation as being new, how new, and new to whom (Johannesson, et al., 2001). For example, if an invention originally developed 100 years ago suddenly reappears in a similar industry, but with the invention now adapted to suit a slightly different application, is this an innovation given it has been previously commercialised? Or is the 'new' invention simply another example of an old idea reengineered or reinvented (Baard & Watts, 2007)? This is just one example of the inherent problems associated with defining innovation, particularly in terms of what constitutes a 'new' innovation. With so many contributing factors making up the innovation process, Quinn (2000) puts it succinctly when he posits 'true innovation is complex and tumultuous — full of spurts, frustrations and sudden insights' (p. 22). Indeed, variations of the word innovation can be used as a noun (innovation), verb (innovate), or an adjective (innovative); hence, it is not surprising there is no all-encompassing business definition of the process.

The value proposition Another complication associated with defining innovation is where no commercial value is realised by the wider marketplace; for example, a new management practice or knowledge creation. The broader definition of innovation is founded on the basic premise that some form of market-based value proposition is

attached once the innovation is commercialised. However, a new management practice introduced into a business would certainly have some inherent value proposition attached, for example, improved productivity or cost efficiency gains (Garcia & Calantone, 2002), but the value proposition may not be transferred to the wider marketplace. Nonetheless, from the context of an organisational perspective (Luecke & Katz, 2003) contend 'Innovation is generally understood as the introduction of a new thing or method…Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes or services' (p. 2). It is apparent that innovation and newness are synonymous with each other. However, the argument that an idea or invention holds no value proposition if it is not shared with others is without substance as there will always be some value generated, even if it is only limited to a single business. This particular notion has considerable support, for example, by researchers such as E. Rogers (2003) who posits:

> An innovation is an idea perceived as new by the individual. It really matters little, as far as human behaviour is concerned, whether or not an idea is objectively new as measured by the amount of time elapsed since its first use or discovery. It is the newness of the idea to the individual that determines his reaction to it…When a more restrictive definition is required, innovation can be preceded by an appropriate adjective such as "technical," "organisational," or some more specific term (p. 13).

Therefore, an innovation need only be new to the individual or the organisation who introduces it, and as long as there is value for those who introduce it, then this can still be defined as a true innovation. Nonetheless, defining innovation is not simply about processes and procedures; it is also about personal attitudes and attributes, discussed next.

Defining innovation has mainly focused on processes and procedures; however, it also concerns personal attitudes and attributes such as entrepreneurship and risk taking. According to Drucker (1994) not all innovators necessarily have an entrepreneurial personality, but all shares a common attribute as 'they are *not* "risk-takers". They try to define the risks they have to take and to minimise them as much as possible' (Drucker, 1994, p. 128). He concludes by stating: 'Successful innovators are conservative…They are not "risk-focused"; they are "opportunity focused"' (p. 128). Additionally, (Zoltan J. Acs & Audretsch, 2003) contend that entrepreneurs by definition have 'an orientation

toward seeking (and acting on) opportunities' (p. 111). Thus, entrepreneurial activities are normally associated with smaller organisations, with an organisational structure and capacity to move quickly on identified service gaps and emerging niche markets with new innovations. However, as noted by Drucker (1994), the most successful innovators are those who possess the ability to accurately assess and minimise the levels of risk, while maximising their focus on the opportunities available. In brief, successful innovation is concerned with personal attitude and attributes towards accurate assessment of the risks and identifying opportunities, rather than being classed as the exclusive domain of entrepreneurship. By synthesising all this information, a definition of innovation used in this thesis is discussed next.

Definition summary Combining all this information, innovation can be defined as both a process and a way-of-being; or, perhaps more precisely, a cultural mindset. This definition takes into account a range of different thinking processes which include: problem solving; evaluating ideas or products; listening to peers and industry experts; networking and collaborating; and identifying and testing new markets. By combining all these elements, a true innovator seeks out the best ways to add, or extract, value for the organisation and the wider community. Subsequently, a summary of the main points drawn from all the extant innovation literature reviewed gives rise to the following definitions.

- Innovation is the introduction and development of a product or process that adds, or extracts, various forms of tangible and intangible value propositions and attainable benefits, to both the businesses and communities, where the innovation has been developed, implemented or adopted.
- Innovation can be equally new to the world markets as it is new to the specific user, and could take the form of radical new solutions for old problems, or the incremental development of something formerly obsolete, or outdated, that was modified and adapted to solve new problems, applications or emerging trends.
- Innovation does not necessarily need to be an original invention, idea, or process, so long as the process or invention is adopted or commercialised by a person or entity within a timeframe that creates reasonable returns on the investment expenditure used to source and implement the innovation.

- Innovation is a complex process that can be influenced from a contextual and cultural perspective; however, it can be more effectively managed and learned, from both an individual and organisational level, through the development and nurturing facilitated by focused knowledge management, educational courses, personal skills development and training programs.

In brief, innovation is primarily concerned with something new, be it a product, process, service or idea that has a certain value proposition attached to it (J Weerawardena, 2003). Moreover, an innovation can be formed from something old; whereby, the process of reinvention and adaptation can create something that solves new problems, has new applications, or is adopted to cater for new opportunities. Indeed, adoption of existing innovations is one of the key elements associated with building innovative capabilities.

1.8 LIMITATIONS OF SCOPE AND KEY ASSUMPTIONS

This section addresses the limitation of scope of this thesis, in addition to clarifying key assumptions attributable to the area of research undertaken. The extant innovation literature reveals numerous theories, models, metrics, definitions and frameworks that focus on the various aspects of innovation and innovation processes. However, the research problem in Section 1.2 identified a lack of consensus about clear definitions of innovation, in addition to the difficulties associated with how it can be measured. Furthermore, much of the research literature focused on medium-to-large organisations (S. Laforet, 2009; Prajogo, et al., 2013), leading to the debate that many of the innovation models and frameworks developed are not transferable, or applicable, to the small business sector (Keskin, 2006); particularly the proxy measures of innovation such as levels of R&D expenditure (Oakey & Cooper, 1991) and patent applications (M. Rogers, 1998). There are also certain differences in the way businesses operate within different industries which impose particular limitations.

Range of businesses and industries One major limitation concerns the variety of businesses operating within the small business sector, and the wide range of industries across which they operate. The reason this imposes a limitation, for example, is the substantial difference in operating procedures. For example, there are considerable differences between a services operation, where the goods are consumed while they are being produced and purchased (Bennett, et al., 2002), and a manufacturing operation

that sells finished goods directly to wholesalers or consumers. These differences relate not only to their operating systems, but their outputs and supply-chain systems are different; thereby, making it extremely difficult to develop measures suited to both business sectors. Moreover, a sole operator has a different organisational structure and operating environment than a business with 15–20 employees. These differences notwithstanding, the questionnaire used to collect the primary data was structured in such a way as to cover the cross-sectional differences between various industry sectors and organisational structures. In brief, every effort was made to account for industry and organisational differences and, thereby, to produce useable data from the majority of small businesses within the primary data sample.

Definition clarity required The second limitation concerns lack of general consensus about the definition of innovation revealed in the literature. Consequently, it was determined to provide each respondent with a clear, concise definition of what constitutes innovation. The definitions used, given below, are taken from the AIBS 2003 and the Oslo Manual; the second definition is included because it incorporates the areas of marketing and organisational methods.

> The term ***innovation*** refers to the process of developing, introducing and implementing a new or significantly improved good or service or a new or significantly improved process. (ABS, 2003)

> An ***innovation*** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. (OECD, 2005)

In addition to providing consistency to the answers given by the survey respondents, it also added to the replicability of the survey (Sekaran, 1992). Furthermore, because there are two distinct types of innovation – radical and incremental – further clarification was given to respondents about the term ‘significantly improved’ being connected to incremental innovation; thus allowing them to clearly distinguish between the two types. Facilitating the distinction between the two types of innovation was deemed to enhance the validity of the findings by making respondents more aware of innovation processes generally and, in turn, garnering a clearer picture of the level of innovation activities being undertaken. In brief, the limitation of definition clarity was

addressed by adopting definitions of innovation recommended by the ABS and the Oslo Manual.

The key assumptions Three key business innovation assumptions are addressed: 1) growth motivations; 2) building innovative capabilities; and 3) the role of collaboration and networks.

Growth assumptions The first assumption relates to the motivations behind business innovation. It is widely assumed that innovation is pursued with the aim of achieving a competitive advantage to enable sustainable growth for the business involved. Indeed, there is much empirical research evidence that supports this assumption. However, there is also considerable anecdotal evidence that not all businesses pursue a growth strategy. For example, during 16 years as a Field Research Interviewer, I interviewed numerous small business operators who simply wanted a particular lifestyle, or wanted to utilise their unique skills and abilities to satisfy small niche markets. In brief, the assumption made is that even if the business is not seeking to grow, they will still engage innovation as a source of competitive advantage. The second business assumption concerns the ability to build innovative capabilities, discussed next.

Building on capabilities It is assumed a business can build their innovative capabilities through the acquisition of external knowledge through a construct known as absorptive capacity (1989, 1990; Zahra & George, 2002). For example, knowledge can be brought into the business through staff training and skills development programmes, and is primarily done to increase the business's learning capability (J Weerawardena, 2003). This construct, or process, is what Cohen and Levinthal (1989, 1990) define as: 'the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends is critical to its innovative capabilities' (p. 128). However, not all businesses are prepared to engage in staff training and skills development programmes; for example, it is particularly difficult for sole operators. Indeed, the findings in chapter 4 indicate that many respondents were very unlikely to personally undertake further training, even though they believed continuous learning was very important. In brief, there are many avenues for obtaining external knowledge to help businesses build on their innovative capabilities, and this is strongly supported by the findings from the primary data sample. The final business assumption concerns networks in collaboration, discussed next.

Networks and collaboration The final business assumption concerns participation in networks, and collaboration activities within industry or regional clusters. Again, the assumption is that businesses engaged in such activities will develop their learning capabilities and acquire new knowledge. For example, when asked what the term 'collaborative innovation' meant, former chief executive of the Australian Business Foundation, Narelle Kennedy, replied: 'Knowledge is power' (Blackie, 2006, p. 20). Nevertheless, not all collaboration is undertaken on the basis of knowledge acquisition; it may be as simple as sharing limited resources such as gaining access to specific machinery, or to share the costs of a combined marketing campaign. Moreover, there is anecdotal evidence to suggest certain businesses are reluctant to engage in collaboration for fear of losing their intellectual property, an asset viewed as a competitive or strategic advantage, to their collaborators. In summary, striving for business growth, building learning capacity through knowledge acquisition, skills development and training, and engaging in collaboration and networking are all acknowledged as being major drivers of innovation.

Taking the best approach One final assumption remains: the methodological approach employed in this thesis. Significant barriers to easy interpretation of the findings encountered in the research literature included: the different ways research was conducted; the range of issues focused on; the different classification for small business; and how the findings were reported. For example, Romijn and Albaladejo (2002) assert 'there is still little empirical evidence about how companies improve their innovation capacity' (p. 1053). Additionally, the authors cite comments made by Hoffman et al. (1998) about the United Kingdom 1992 Cambridge Small-to-Medium Enterprise survey that used a sample of 2000 small firms which states:

> …the data collected and presented in the section on technology and innovation is largely qualitative, based on subjective perceptions of SMEs; and the analysis, though suggestive of some useful broad correlations, does not quantify innovative investment (Hoffman, Parejo, Bessant, & Perren, 1998, p. 42).

Atherton and Hannon (2000) cited research by Lowe (1995), who suggested that previous research on innovation generally has only provided limited insight into the entire process because of a tendency for researchers to view innovation as being narrowly defined. Subsequently, the final assumption is that using a multi-methods

approach in the research design will overcome some of these limitations. For example, the SLR process provides an evidence-informed background to previous research, which is combined with multi-methods data collection as per the guidelines detailed in the Oslo Manual (OECD/Eurostat, 2005). In brief, it is presumed the methodology selected for this thesis adequately addresses some of the shortcomings identified in the research literature.

1.9 SUMMARY

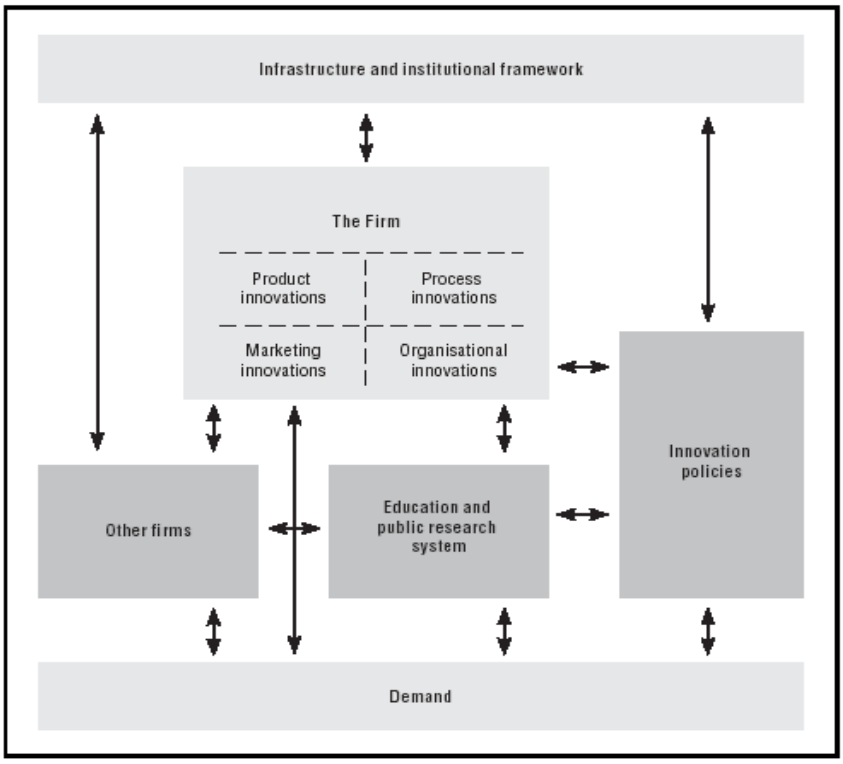
Innovation is undeniably a complex and ill-defined process when investigated in the context of small business operations. The wide range of influencing factors, processes, and personal characteristics addressed by previous innovation researchers reflects this complexity (Tidd, et al., 1997). A summary of the main areas of innovation researched is listed below, and this helped determine the guidelines and direction of this thesis, particularly once the SLR was completed. A condensed overview of these main research areas includes:

- The diffusion of innovation process and spillover effects;
- Absorptive capacity, training, and learning capabilities;
- Entrepreneurship, risk taking, and capitalising on opportunities;
- Networking, cooperation, and collaboration;
- Industry clusters and geographic concentrations;
- Measurement of innovation processes, outputs and performance;
- Organisational behaviour, structure, and culture.

There are also various subsets of additional themes within each of the areas listed above; nevertheless, these areas formed the basic guidelines that directed the focus of the innovation research literature review.

The topic of innovation measurement remains a contentious point, typified by the concern that current innovation proxy measures are deemed inappropriate for small business. For example, the proxy measures of R&D expenditure and patent counts were developed for larger businesses; hence, such measures cannot transfer directly to small business operations. Nonetheless, one broad-based innovation measurement framework already available was developed for the Oslo Manual (OECD/Eurostat, 2005) with the resulting framework shown below in Figure 1.2. Moreover, details guiding the

collection and interpretation of innovation data contained in the Oslo Manual are used by the ABS innovation surveys. The framework in Figure 1.2, one of several available in the wider literature, illustrates the complexities associated with the development of appropriate measures and indicators for accurately and consistently measuring innovation processes and outputs. However, the elements within the framework are applicable to small business environments; thus, they provide a solid basis for guiding the development of suitable innovation measures for this important sector. Nonetheless, the advent of the Internet has demonstrated how the forces of creative destruction can quickly affect successful business models, discussed next.



Sourced from the Oslo Manual: Guidelines for collecting and interpreting innovation data (OECD/Eurostat, 2005)

Figure 1.2 **The Innovation Measurement Framework**

Inevitably, change is the one constant we can rely on; consequently, businesses need to be able to adapt and take advantage of new opportunities. Thus, innovation is an important way to achieve what Weerawardena (2000; 2003) contends is the main solution for successful growth: to maintain a sustained competitive advantage through learning capabilities and differentiation. However, not all small businesses want growth; albeit, innovation would still lead to improved operating efficiencies and service delivery systems resulting in sustainable competitive advantage. Indeed,

innovation allows a business to evolve, and adapt, to changing operating environments, a point discussed further in chapter 6. Innovation can be either radical, incremental or both; whereby, it can affect all facets and levels of the business. Hence, the substantive conclusion is the overall benefits of innovation will invariably have the long-term outcome of adding some form of positive value to a business; whereby, it could be in the form of improved productivity, increased efficiencies, improved organisational culture or more environmentally friendly operating practices.

CHAPTER 2

A dual procedure literature review

Outline of Chapter 2	
Section	**Contents**
2.1	***Introduction*** Highlights the empirical value and importance of undertaking a literature review of the research topic area; which involved the combination of two review processes, the traditional narrative review and a Systematic Literature Review. Presents a visual schematic on the chapter's structural outline.
2.2	***Identifying the research problems*** Discusses the identified knowledge gaps and potential research problems of undertaking innovation research, particularly aspects that contribute to innovation processes in the context of small business operations.
2.3	***Defining the Systematic Literature Review (SLR) process*** Presents the inherent benefit associated with using the SLR process, and compares it with the traditional narrative review process. Discusses the SLR design and implementation procedures which include: the development of the review protocol; search string development; inclusion and exclusion criteria; and, the final selection process.
2.4	***Descriptive summary of the SLR results*** Presents a summarised overview of the research papers reviewed. Covers such aspects as: journals represented; industry sectors; methodology and data collection procedures; country or region representation; analysis techniques; thematic content focus; and, finishes with an appraisal of the SLR process.
2.5	***Background of innovation research*** Identifies several difficulties with conducting innovation research, and examines a range of research parent theories which contribute to the complexity of innovation research. Issues covered include: the reinvention process; collection of financial data; the lack of suitable measures; and, adoption and adaptation processes. The section finishes by examining a range of innovation models and frameworks.
2.6	***Innovation in Australian Business Survey 2003*** Discusses and evaluates the implementation procedures and summarised findings of the ABS's Innovation in Australian Business Survey 2003, and identifies knowledge gaps which need to be addressed in the context of small business innovation.
2.7	***Research problems theory*** Provides examination of several issues associated with small business problem theory, which included: the transferability of large organisation constructs and models; the inappropriateness of current innovation proxy measures; and, debate about the paucity of small business innovation research.
2.8	***Summary*** Presents a summary of the main contents, and contextual important aspects, relative to the findings from the innovation research literature review.

2.1 INTRODUCTION

The purpose of this chapter is to evaluate, describe, summarise and synthesise the contents of the extant small business innovation research literature reviewed. Two literature review methods are used, whereby the objective of employing a systematic literature review process is to map the extant research literature focused on small business innovation covering the past 25 years. The aim is to consolidate the main research topics and emerging themes, identify existing information or knowledge gaps pertaining to Australian regional small businesses, and summarise the overall review findings. The combined literature reviews has particular emphasis on small business innovation because it is reported to be poorly represented within the empirical research literature (Bhattacharya & Bloch, 2004; Hausman, 2005; M. Rogers & Helmers, 2009). However, there are substantial volumes of research papers and textbooks available that focus on all manner of innovation research and its related business practices. Nonetheless, the information gap identified from the literature review is that there is only limited empirical research available specifically focused on small business innovation in regional Australia. Thus, in an effort to provide a comprehensive view of the previous innovation research conducted, a combined approach to the literature review was undertaken, discussed next

Importantly, the literature review was conducted using two different, yet complementary, review processes. First, a traditional, or narrative, literature review process was undertaken as an a priori exploration with the purpose of preparing a research thesis statement. Second, a more recently adopted form of management literature review process, compared with the traditional literature review process (Becheikh, et al., 2006), was conducted employing a systematic literature review (SLR) process. The SLR process is normally associated with medical literature reviews; nevertheless, the process has recently found favour with management researchers as a way for 'developing evidence-informed management knowledge' (Tranfield, et al., 2003, p. 207). The following sections discuss how the chapter is structured, provide a schematic outline to visually map the content structure, examine the stages of how the SLR process was developed and implemented, and conclude with a summarised overview of the combined literature review findings. Next, the chapter structure is discussed.

Chapter structure The content structure of chapter 2, visually represented in Figure 2.1, is divided into five major sections. The first section starts by examining the basic research problem identified through the combined literature reviews. For example, the two key research problems identified during an a priori exploration of the small business innovation research literature were: 1) a lack of definitional clarity of innovation process drivers in small business; and 2) inappropriate, or non-transferable, measures for the measuring of innovation processes and outputs. This is followed with a definition of the SLR process, and the overall benefits associated with its application are explained. The second section provides details for the development of the SLR protocol, the implementation process, justification, and concludes with the overall SLR

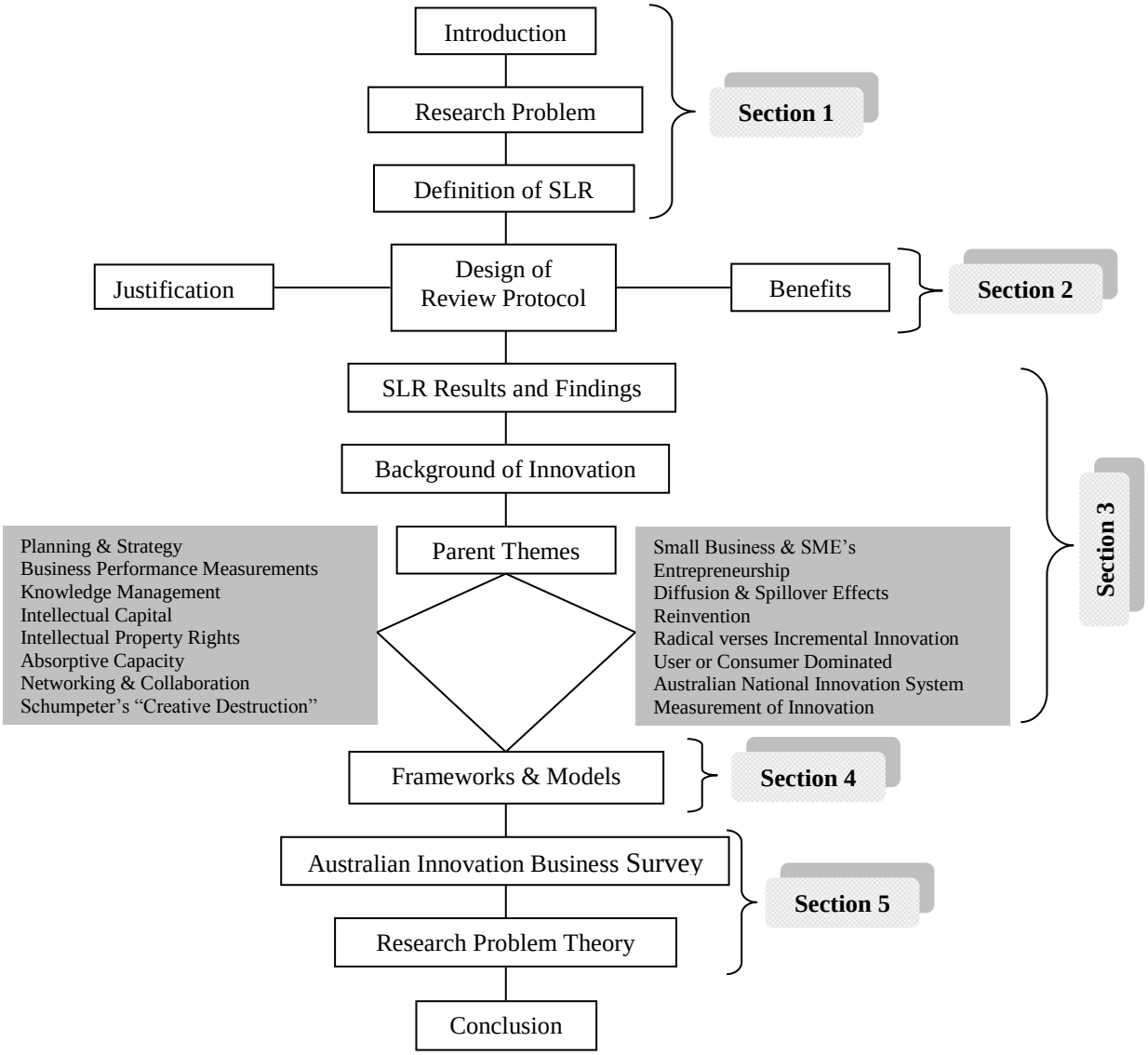


Figure 2.1 **Schematic of chapter 2 structural outline**

results and findings. The third section discusses the main parent themes that emerged from the literature reviews; whereby, it summarises the past 25 years (1985–2010) of small business innovation research. Additionally, an examination of various innovation frameworks and models are discussed. The fourth section briefly examines the findings from the ABS IABS 2003 dataset, whilst also identifying specific knowledge gaps within these findings. The final section examines the underlying theory behind research problems associated with collection of primary data, and finishes by summarising the combined findings of both literature reviews. Next, details about research problems associated with development of the SLR protocol are discussed.

2.2 IDENTIFYING THE RESEARCH PROBLEM

The findings from an a priori review of the small business innovation research literature identified several important knowledge gaps in the context of Australian regional small businesses. The knowledge gaps provided the foundational focus for construction of the questionnaire used to collect the primary data. Thus, several areas of interest arising from within the knowledge gaps identified in the research literature review include:

- What are the main types of innovation activities occurring in Australian regional small businesses?
- How can innovation activities and outputs in Australian regional small business be accurately measured?
- Can incremental innovation be measured in Australian regional small businesses, particularly in the services industry?
- What are the reasons Australian regional small businesses innovate?
- Are late adopters of external ideas and/or technologies still classed as innovators?
- What role does networking and/or collaboration play in developing innovation capabilities within Australian regional small businesses?
- What links, if any, exist between higher education levels and innovation activities?

There are many other aspects associated with innovation activities that require investigation such as market orientation, customer engagement, learning capabilities and entrepreneurial attributes; however, inclusion of these topic areas would enlarge the research scope enormously and is beyond the exploratory boundaries of this thesis.

Therefore, the traditional literature review provided purposeful, broad-based, knowledge on past small business innovation research while identifying specific knowledge gaps. The a priori review enabled identification of potential research problems that may be encountered; for example, difficulties collecting financial data (Dess & Robinson, 1984; OECD/Eurostat, 2005). Further, the initial research literature overview narrowed the research area focus; thereby, underpinning the development of the research questions, in addition to providing the grounding for the development of the review protocol for the SLR process. In brief, the IABS 2003 findings combined with the findings of an a priori literature review provided evidence for a world view of small business innovation practices and past innovation research; whereby, the synthesised findings laid strong foundations for developing the SLR protocol. Next, a short definition of the SLR process is discussed.

2.3 DEFINING A SYSTEMATIC LITERATURE REVIEW

The actual SLR process, taken literally, is an apt definition of the process in its own right: it is a research literature review conducted in a systematic way. The entire process is systematically planned, formally documented and methodically implemented to enable other researchers to easily replicate the procedure (L. Pittaway, et al., 2004; Tranfield, et al., 2003). Accordingly, Tranfield et al. (2003) argue the SLR process is a highly efficient way to obtain evidence-based information from the extant research literature under review. Not only does the SLR process provide a comprehensive insight into the range of research projects undertaken previously in a particular area, but it also enables major gaps within that particular research field to be more readily identified (Kitchenham, 2004). Hence, there are significant differences between the SLR process and traditional literature reviews, discussed next.

Firstly, the traditional narrative literature review is often described as non-systematic with a relatively ad hoc approach (Bhandari, Guyatt, Montori, Devereaux, & Swiontkowski, 2002). The results from a traditional literature review are often inconsistent and not easily replicated. According to Sekaran (1992), one of the eight hallmark characteristics distinguishing good scientific research is replicability; whereby, the methodical, transparent and easy-to-replicate SLR process meets this hallmark (Franco-Santos & Bourne, 2005). Furthermore, because the entire SLR process is fully documented, allowing for easy replication, it also minimises researcher

bias and subjectivity (Bhandari, et al., 2002; Kitchenham, 2004). Finally, while advocating the advantages of the SLR approach for producing evidence-informed knowledge, Tranfield et al. (2003) assert: 'This emphasis on producing a science base, which is both rigorous in formulation and relevant in practice, is a key characteristic of an evidence-based approach' (p. 210). In brief, the SLR process is defined as an objective, methodical and replicable approach that minimises research bias whilst providing a strong evidence-based output from the literature reviewed. Next, the development of the SLR protocol is discussed.

2.3.1 Designing and implementing the SLR process

The evidence-based paradigm advocates the objective evaluation and synthesis of empirical results of relevance to a particular research question through a process of systematic literature review and the integration of that evidence into professional practice (Brereton, Kitchenham, Budgen, Turner, & Khalil, 2007, p. 571).

Developing a review protocol The most important aspect of conducting an SLR process is the development of a formalised review protocol (Kitchenham, et al., 2009; L. Pittaway, et al., 2004; Tranfield, et al., 2003). The SLR process was previously almost exclusively used in the domain of medical science research. However, the past decade has seen it used more widely by a range of research fields including, but not limited to: management and business research; environmental science; nursing practices; criminal justice; housing policy and social care (Tranfield, et al., 2003). From an empirical research perspective, making the most of the extant literature is extremely important because, as Yin (1991) postulates, 'research literature, by definition, consists of empirical work' (p. 301). Hence, the following paragraphs describe in detail the development and implementation procedures associated with the SLR process, starting with why a protocol is important, discussed next.

One compelling reason why the SLR process starts with the development of a review protocol is because it reduces the possibility of research bias (Bhandari, et al., 2002; Kitchenham, 2004; Tranfield, et al., 2003). For example, Tranfield et al. (2003) argue the protocol is 'a plan that helps to protect objectivity by providing explicit descriptions of the steps to be taken' (p. 215). Further, the authors assert the SLR protocol 'aims to minimise bias through exhaustive literature searches...by providing an audit trail of the reviewer's decisions, procedures and conclusion' (Tranfield, et al., 2003, p. 209). This

is important because it allows future researchers to easily replicate the procedure undertaken, in addition to providing documented details for establishing procedural validity. In brief, the development of a protocol for the SLR process offers the advantages of reducing researcher bias while supporting its validity. Next, details of the first stage in the protocol development are discussed.

Stages of development Just as the SLR process itself is defined by a number of different stages, so too is the development of the review protocol. The first stage in the development of the review protocol involves the identification of the research topic(s), and defining the questions which are to be addressed by the review (Bhandari, et al., 2002; Kitchenham, 2004). This first stage of the protocol development is simply the planning stage; thus, it is not dissimilar to the first stage undertaken for any traditional research literature review (Yin, 1991). Subsequently, planning how the protocol development process takes place is essential to ensure the SLR process adequately addresses the requirements of the research being undertaken, and this can be achieved through the use of a reflective cycle, discussed next.

The importance of the planning stage of the protocol development is critical, as emphasised by Dr Christine Bruce from the Queensland University of Technology. In a document titled *Supporting literature reviews: materials for supervisors to use with students*, authored by Dr Bruce (n.d.), she introduces a reflective model for undertaking a literature review made up of two parts. The first part is described as a reflective cycle process comprised of four stages: planning, acting, recording and reflecting. The second part is determined by the characteristics of the person conducting the review which will ultimately influence the way the person engages in the first part. Furthermore, when expanding upon each stage within the reflective cycle, Dr Bruce advises an additional stage of design inserted between the acting and recording stages; whereby, the aggregation of all these stages adds up to what constitutes a research literature review protocol. Thus, similar to the SLR protocol development recommendations, Dr Bruce emphasises the importance of determining the inherent goals for the review, what questions require answers, and what literature resources and databases need examination in order to source the relevant literature. In brief, planning is the first important step in the development of the SLR protocol; therefore, using the guidelines

from both Dr Bruce and the SLR process literature, the planning stages of the protocol development are discussed next.

Stage One: what to review? The first step of the protocol development involves deciding what research areas of small business innovation require review. The answer was provided by the findings from the initial traditional literature review, undertaken while preparing the thesis research statement. Using these findings as guidance, the following areas of the research literature were determined as the main focal points for the SLR process. These research areas include:

- small business innovation;
- the links between entrepreneurship and innovation practices;
- different learning practices and absorptive capacity;
- the diffusion of innovation and knowledge/technological spillovers;
- adoption rates of innovation processes and practices;
- knowledge management and education/training; and finally,
- a particular emphasis on Australian-based small business innovation research.

Importantly, while acknowledging the existence of many industry and government reports, academic and practitioner textbooks, and numerous grey literature articles on the development and management of innovation, the SLR process focused solely on academic journal research studies. The rationale is to simplify the procedure, and to ensure any researcher who wants to replicate the SLR process can do so easily via the Internet. Thus, having identified the main areas of research focus for the SLR process, the next step is development of the search strings used during the Internet search of electronic databases; whereby, a number of SLR-based reports provided excellent guidance for this step, discussed next.

One excellent source of information on SLR protocol development procedures is a report focused on the links between networking and innovation in the United Kingdom (L. Pittaway, et al., 2004). It provides examples of relevant electronic database search strings, including examples of inclusion and exclusion selection criteria. Other useful SLR-based reports include the evolution of knowledge within SMEs (R. Thorpe, Holt, Macpherson, & Pittaway, 2006), and a third report which researched external knowledge and expertise related to business growth and development (Bessant, Phelps,

& Adams, 2005). The reports are based on United Kingdom research and provided guidance in developing relevant search strings, an example of which is shown in Table 2.1, to undertake the research procedure of the relevant journal papers within selected electronic databases. However, such protocol development procedures are normally conducted by a panel of researchers, discussed next.

Table 2.1 **An example of a simple search string using Emerald database**

Advanced search input string	Database generated command string	Results
small business AND innovat* Years 1985 - 2010	All fields AND 1985 : 2010 / YEAR	**21,683**
small business AND innovat* Years 1985 - 2010 *Search within results excluding full text*	All fields / small business AND innovat* AND YEAR /1985 : 2010 and small business AND innovat* / All fields(excluding fulltext) AND 1985 : 2010 / YEAR	**256**
small business AND innovat* Years 1985 - 2010 *Search within results excluding full text but including abstracts*	All fields / small business AND innovat* AND YEAR /1985 : 2010 and All fields(excluding fulltext) / small business AND innovat* AND YEAR / 1985 : 2010 / YEAR and small business AND innovat* / Abstract AND 1985 : 2010 / YEAR	**133**

Importantly, all three reports, in addition to journal articles detailing the use of SLR procedures, had support of an academic review panel for the protocol development. That is, the development of the SLR protocol, and the actual review of the literature, was done with a panel comprising multiple experts in the particular field being studied. Even though these reports provided excellent guidance and examples for the development and implementation of the protocol and the SLR process, all the development and decision-making for this thesis was undertaken by one person. This resulted in a potential limitation in the protocol development, particularly in terms of the definitions used to determine the inclusion and exclusion criteria applied to the literature selection process. Subsequently, a decision was made to keep the entire SLR process as simple as possible, discussed next.

Keeping the process simple The entire SLR process was kept simple and the search strings detailed in Table 2.1 reflect this simplified approach. The timeframe covered by the search is 25 years; thereby, allowing for research methodology evolution to be covered by the review period (Mullen, Budeva, & Doney, 2009; Tan, Fischer, Mitchell, & Phan, 2009). The initial search string was *small business AND innovat**, and several test runs were conducted within various electronic databases to evaluate the adequacy of the returned sample before running it with the following electronic databases: Emerald, ProQuest, ScienceDirect, Web of Science and Wiley InterScience. To further refine the initial results of each database search, two further search queries with additional filters were run within each sample; whereby, the number of papers returned after each filtered query is shown in Table 2.2. Next, the inclusion and exclusion criterion used during the final selection stage is discussed.

Table 2.2 **Electronic database search procedure results of SLR sample**

Database name	Search result 1	Search result 2	Search result 3	Final selection
Emerald	21,683	256	133	81
ProQuest	3,225	121	36	7
ScienceDirect	54,145	1,459	442	113
Web of Science	663	297	97	15
Wiley InterScience	1,084	131	19	0
Total from search	80,800	2,264	727	216

Stage Two: study selection criteria The second stage involved constructing inclusion and exclusion criteria to select journal papers after reading their abstracts. For example, inclusion and exclusion criteria have the primary aim to ensure that papers reviewed provide direct evidence related to the research questions (L. Pittaway, et al., 2004; Tranfield, et al., 2003). Keeping the selection criteria as objective as possible reduces the likelihood of subjective bias according to Kitchenham (2004), who argues various factors could affect the inclusion selection process. These include: the background knowledge of researchers; their area of research specialisation; institutions they are affiliated with; and journals they may have previously published in. Unless papers can be explicitly excluded – based on the content of their titles or abstracts, for example – full text copies need to be read, a procedure which was adopted for this thesis. The inclusion and exclusion selection criteria used during the final selection process are detailed in Table 2.3 and 2.4. In brief, documenting the inclusion and exclusion criteria used for the selection of papers provides consistency within the review process. Next, the steps involved in selecting the studies are discussed.

Table 2.3 **Inclusion criteria for paper selection of SLR sample**

#	*Criteria*	*Reason for Inclusion*
1	Electronic database journal papers only	Provides ease of replication
2	Must relate to innovation in some form	Maintains focus on main topic of research
3	Include small–medium enterprises (SMEs)	Accommodates for the disparity of small business definitions
4	Published between the years 1985 and 2010	Establishes solid background of prior research
5	Include entrepreneurship studies	Facilitate associated links between entrepreneurship, start-ups and innovation
6	Include knowledge management and/or knowledge transfer/spillover studies	An important element in the development and diffusion of innovation
7	Can be small firm versus large firm comparison studies	Distils the differences and/or similarities between small and large firm innovation procedures
8	Include government policy and literature reviews	Accommodates innovation-related government support programs and empirical studies based on assessment of the literature and previous research
9	Include editorials and/or opinion papers	Similar to reason number eight
10	English language papers only	Makes for easy review

Table 2.4 **Exclusion criteria for paper selection of SLR sample**

#	*Criteria*	*Reason for Exclusion*
1	Books, conference papers, reports, editorials or opinion pieces not published in a recognised electronic database journal	Keeps the search process simple and easy to replicate
2	Papers not related to innovation in some way	Maintains focus on main research topic
3	Papers not focused on small firms or SMEs	Maintains focus on the main subject related to the research topic
4	Any research studies published prior to 1985	Keeps the search within a manageable timeframe
5	Papers focused solely on large firms or corporations	Maintains focus on the main subject related to the research topic
6	Papers published in a language other than English	Maintains ease of review
7	Any papers without abstracts, publication dates, authors names, access to full text or a URL address to acquire this information	Provides acceptable final selection criteria when processing the downloaded papers through visual observation

Stage Three: the actual selection process The final stage involved the actual implementation of the protocol applying the selection criteria using visual observation. To acquire the research literature database, the implementation process was conducted in a number of sequential steps:

1. selection of appropriate electronic databases;

2. conduct initial search using the appropriate search string;
3. conduct a second search within results using modified search string;
4. conduct final search within results using final search string;
5. download results of final search into EndNote database; and,
6. repeat process for the other four selected electronic databases.

A total of 727 research papers resulted from searching the five databases and were loaded into an EndNote database. The next step in the selection process was conducted through visual observation; whereby, each individual paper was scanned for certain information such as abstracts, authors' names, publication dates, access to full text, or lack of a URL address. Consequently, completion of this observation step reduced the number of usable papers to a total of 216. The final observation step involved reading each individual abstract while applying the selection criteria guidelines; this reduced the sample further to a total of 152 papers. Finally, during the review of the full text, a further seven papers were eliminated to yield a total sample of 145 papers. In brief, from an initial sample of 727 papers downloaded into the EndNote database, the two-stage visual observation step reduced this number to a final sample of 145 papers. Next, the overall findings from the review of these papers are discussed.

2.4 DESCRIPTIVE SUMMARY OF SLR RESULTS

The structure and discussion for presenting the SLR results is as follows:

a) the breadth and percentages of the journals from which the studies were drawn;
b) summaries of the industries, methodologies, data collection methods, analysis techniques applied, and countries the studies covered;
c) a summary of the main themes and issues being researched.

While each paper was being reviewed, a pre-coded list (Babbie, 2002) of research categories in point b) were recorded and entered into a Microsoft® Excel spreadsheet; thereby, enabling the final summary analysis to take place. In brief, the descriptive tables provided an easy-to-read format for presentation of the SLR results. Next, the details of the SLR results are discussed.

Expansive journal representation The first result examined is the breadth of journals the SLR literature sample was drawn from. The full results are presented in Table A.1 in the Appendix, which shows the sample was drawn from a total of 71 journals

covering a wide range of research areas. There was a substantial gap between the journals that yielded the most papers, the Journal of Small Business and Enterprise Development with 22 papers (15.2 per cent), and the next highest yielding journals of which there were four, each yielding nine papers. When aggregated, these five journals yielded a total of 58 papers, which accounted for 40 per cent of the total literature sample reviewed. What came as a surprise was the breadth of journals in the SLR sample; thereby, demonstrating the far-reaching coverage of innovation research during the 25-year review period. In brief, while only five journals accounted for 40 per cent of the sample reviewed, the overall findings were consistent with the notion that innovation research is conducted across many areas of interest and industries. Next, the results of the industry coverage are discussed.

Multiple industry coverage Analysing the industry coverage of the papers reviewed revealed a sizeable percentage focused on multiple industries. For example, the results displayed in Table 2.6 indicate 52 papers, or 35.9 per cent, used multiple industry coverage in their research sample.

Table 2.6 **Industry and methodology frequencies of SLR study sample**

Industry	Total	%	Methodology	Total	%
1 - Manufacturing	24	*16.6*	1 - Quantitative	28	*19.3*
2 - Retail	3	*2.1*	2 - Qualitative	34	*23.4*
3 - Services	7	*4.8*	3 - Mixed method	13	*9.0*
4 - IT/ITC	6	*4.1*	4 - Case study	23	*15.9*
5 - Rural	6	*4.1*	5 - Comparative	10	*6.9*
6 - Biotechnology	3	*2.1*	6 - Literature review	14	*9.7*
7 - High-technology	10	*6.9*	7 - Policy review	13	*9.0*
8 - Processing	2	*1.4*	8 - Combination	7	*4.8*
9 - Multiple	52	*35.9*	9 - Other	3	*2.1*
10 - Non-specific	28	*19.3*			
11 - Print/Package	2	*1.4*			
12 - Education	1	*0.7*			
13 - Construction	1	*0.7*			

The next highest group of papers were non-specific industries with a total of 28 papers (19.3 per cent). The largest specific single industry sample, with a total of 24 papers (16.6 per cent), focused on manufacturing. The next highest industry sector after manufacturing was the high technology sector with 10 papers (6.9 per cent), followed by the services sector with seven papers (4.8 per cent). Nevertheless, after reviewing all

the papers from the sample, it was concluded a representative cross-section of industries was included. In brief, satisfied that a good cross-section of industry sectors was represented in the sample, the various methodologies used are discussed next.

Qualifying of methodologies Defining methodological techniques are often described as complex and demanding (McElwee & Atherton, 2005). Subsequently, a decision was made to clearly delineate between qualitative research methods and case studies. For example, a paper's methodology was recorded as a case study if the term was emphasised specifically, otherwise it was recorded as a qualitative study. A summary of the various methodologies used in the literature sample are shown in Table 2.6; whereby, the most frequent methodologies used were qualitative with 23.4 per cent, quantitative with 19.3 per cent and case studies with 15.9 per cent. In brief, the methodological techniques employed by the sample papers ranged widely; albeit, the majority still involved the more traditional methodologies. Next, results from the data collection procedures are discussed.

Collecting the data The results from the data collection procedures used by the papers reviewed in the literature sample are documented in Table 2.7. Interestingly, data collection methods using in-depth interviews, secondary data from government or industry bodies and mail-out surveys all feature prominently, with the procedures respectively recording 24, 23 and 22 papers. However, when identifying the data collection procedures used in each paper, the procedure recorded was again the main one emphasised by the authors. For example, a mail-out survey using a structured questionnaire was only recorded as a structured questionnaire if it was explicitly stated by the authors. A number of authors were unclear regarding their data collection procedures; for example, whether telephone surveys constituted structured or semi-structured interviews. Another area requiring clarification was where a combination of data collection procedures was recorded. For example, a paper by Davidsson (1991) initially used telephone interviews, then followed up with a mail-out questionnaire. Interestingly, and given the proliferation of fast, low cost, communications using the Internet, there was only one Web-based survey used for data collection within the sample. In brief, a good cross-section of data collection procedures was represented within the literature sample, with no one procedure clearly dominant, or favoured, by

researchers. In contrast, this was not the case regarding the country the research was conducted in, discussed next.

Table 2.7 **Data collection methods and country/region frequencies of SLR study sample**

Data Collection Methods	Total	%	Country/Region	Total	%
1 - Mail-out surveys	22	*15.2*	1 - United States	36	*24.8*
2 - Structured questionnaires	11	*7.6*	2 - Canada	5	*3.4*
3 - Semi-structured interviews	19	*13.1*	3 - United Kingdom	36	*24.8*
4 - In-depth interviews	24	*16.6*	4 - South America	0	*0.0*
5 - Govt/Industry statistics	23	*15.9*	5 - Africa	1	*0.7*
6 – Telephone survey	6	*4.1*	6 - Australia	12	*8.3*
7 - Web-based survey	1	*0.7*	7 - European Union	25	*17.2*
8 - Combination	18	*12.4*	8 - China/Taiwan	6	*4.1*
9 - Literature/Other	21	*14.5*	9 - India	0	*0.0*
			10 - New Zealand	2	*1.4*
			11 - Multi country	18	*12.4*
			12 - Not specified	3	*2.1*
			13 - Other Asian	1	*0.7*

Country of origin Based on the results of the country of origin where the research took place, two countries clearly dominated the literature sample. As detailed in Table 2.7, the United States and United Kingdom accounted for almost 50 per cent of the total literature sample reviewed. The remaining papers were spread across nine different countries and regions, with three papers recorded as the country of origin not specified. For example, the paper by Courseault, Trumbach, Payne and Kongthon (2006) investigated links between technology, or data mining, and competitive advantage in small firms. Using a case study approach, the authors de-identified the firm involved and did not state the country of operation. Importantly, Australia recorded 12 papers (8.3 per cent) providing an adequate representation from a local content perspective, whereas South America and countries surrounding the Indian continent were not represented. In brief, the United States and United Kingdom dominated in terms of research being undertaken; however, many small countries within the Soviet Republic, and Asian, South American and African continents were largely unrepresented. Next, a summary of the analysis techniques used are discussed.

Analysing the analysis The problem encountered with identifying methodology and data collection methods also occurred with identification of analysis techniques: unclear

definitions. Again a simple approach was applied, whereby the analysis technique recorded was the one that was explicitly stated by the authors of the paper reviewed. As a consequence, a range of important analytical tests, such as the Z-test, T-test and Chi-squared tests, were not recorded even though they featured as part of a combined analytical approach, the details of which are presented in Table 2.8. The most frequent analysis technique used was content/thematic/discourse analysis with 48 papers represented, accounting for 33.1 per cent of the literature sample.

Table 2.8 **Analysis techniques and test frequency of the literature sample**

Analysis Techniques	Total	*%*
0 - Not stated	14	*9.7*
1 - Descriptive tables	2	*1.4*
2 - Comparative tables	18	*12.4*
3 - Logical Regression	1	*0.7*
4 - Multiple Regression	5	*3.4*
5 - Chi-squared	0	*0.0*
6 - Z-test	0	*0.0*
7 - T-test	0	*0.0*
8 - ANOVA	2	*1.4*
9 - MANOVA	3	*2.1*
10 - Logit Regression	4	*2.8*
11 - Multiple / Combined analysis methods	35	*24.1*
12 - Content / Thematic / Discourse Analysis	48	*33.1*
13 - Social networks analysis	1	*0.7*
14 - Discriminant function analysis	2	*1.4*
15 - Fuzzy Analytic Hierarchy Process (FAHP)	1	*0.7*
16 - Partial least squares	1	*0.7*
17 - Ordinary least squares	1	*0.7*
18 - Structural Equation Modelling	2	*1.4*
19 – Bootstrapping analysis	0	*0.0*
20 - Cluster analysis	1	*0.7*
21 - Factor analysis	3	*2.1*
22 - Correlation analysis	1	*0.7*

Moreover, a total of 35 papers (24.1 per cent) used a multiple/combined analytical approach. A further 18 papers (12.4 per cent) used the third most popular analysis technique, comparative tables. Unfortunately, 14 papers (9.7 per cent) did not clearly state the use of any specified analysis techniques. For example, a paper by Acs (1988) that investigated links between flexible technologies and innovation within the US steel industry was in the form of a literature review; however, it contained substantial amounts of secondary statistical data without stating the application of any specific

analysis techniques. In brief, content/thematic and multiple analysis techniques was the most frequent analysis techniques used. Next, the review process uncovered a new form of analysis technique, discussed next.

New analysis technique unveiled The upside of the literature review process was introduction to a completely new form of analysis technique called Fuzzy Analytic Hierarchy Process (FAHP). This technique was used in a paper investigating the construct of innovative capital, and how it is used to improve innovative operations in small enterprises in Taiwan (Chen & Chen, 2007). Not only was the FAHP analysis technique a new approach, but the construct of innovative capital was also deemed novel. Interestingly, Chen and Chen (2007) define the FAHP as a technique 'used to analyse the opinions collected from a sample of experts' (p. 159). Originally known as fuzzy set theory, first developed in 1965 by Professor L.A. Zadeh, the technique was applied to solve identified fuzzy phenomena and problems existing in the real world; for example, where the phenomena was deemed to be 'uncertain, incomplete, unspecific and fuzzy situations' (p. 160). Once applied, it identified unspecific and fuzzy characteristics in language evaluation through its use of a membership function concept to represent a field known as a fuzzy set; whereby, the field would contain the variables 'incompletely belong to' and 'incompletely not belong to' (p. 160). In brief, this analysis technique appears to be a sophisticated variant of discourse analysis used to analyse verbal content. However, a more interesting feature of the paper was the authors' construct of innovative capital, discussed next.

Innovative capital indices The more interesting feature in Chen and Chen's paper was their construct of innovative capital. Bearing close similarities to the construct of intellectual capital, the authors developed an index to measure innovative capital within the Taiwanese small business sector. The authors define innovative capital as the inherent innovative ability, and intrinsically related capabilities, the business possesses. The construct incorporates such factors as explicit intellectual property protection rights, such as patents or trademarks, and the business's implicit research ability directly related to innovative developments. Moreover, the authors reinforce the similarities between intellectual and innovative capital by arguing that research indicates intellectual capital invariably has innovation as the major outcome. In brief, the construct of innovative capital, while similar to intellectual capital, holds the

potential for being a predictive indicator of innovation outputs for the small business sector. Next, the emerging themes and constructs from the literature sample are discussed.

Steps for examining the contents The topics and emerging themes covered a multitude of areas; thus, a systematic approach to their identification was applied. Initially, all the main research areas and emerging themes identified during the traditional literature review were listed, and numerically pre-coded (Babbie, 2002), prior to the SLR process taking place. Further, as a new research area, construct or theme emerged during the review, it was added to the list with a new numeric code. A number of key research areas and emerging themes deemed to be similar were then homologised and placed into one overarching category. This was done because several research topics, constructs and themes are intrinsically interlinked or related. For example, papers researching the development of models, theories and frameworks pertaining to innovation processes are all closely related; therefore, they were all placed into a single category (see code #17 in Table 2.9). The second reason for homologating related research topics and themes was to reduce the total number of list entries to a manageable size. However, many papers researched multiple themes or topics requiring a more measured approach, discussed next.

To maintain a level of robustness and accuracy concerning identification of the research contents, each paper was allocated four list entries presented in Table 2.9. For example, a paper by Hadjimanolis (2000), *A resource-based view of innovativeness in small firms,* was listed in the categories of building capabilities/collaboration; characteristics-personal/business; strategic/marketing orientation; and technical change. The reason for allocating four entry listings was to provide a more accurate overview, and richness, of the research topics and emerging themes within the literature sample. Alternatively, trying to synthesise the multifaceted approach of many of the studies into one single category would have been extremely difficult. In brief, the use of multiple category entries provides a more accurate assessment of the research topics and themes, the results of which are discussed next.

Table 2.9 **Research areas and emerging theme frequencies of SLR study sample**

Categories of Research Areas and Emerging Themes	Total	%
1 - Adoption processes	26	*17.9*
2 - Age and/or size	6	*4.1*
3 - Barriers / Start-ups	16	*11.0*
4 - Build capabilities / Collaboration	39	*26.9*
5 - Characteristics – Personal and/or business	54	*37.2*
6 - Competitive advantage / Customer service	45	*31.0*
7 - Diffusion of innovation – Processes and/or techniques	16	*11.0*
8 - Disruptive innovation / Creative destruction	11	*7.6*
9 - Entrepreneurship – Characteristics and/or procedures	37	*25.5*
10 - Government programs / Policy review	16	*11.0*
11 - Growth factors	31	*21.4*
12 - High-technology / Intellectual property	8	*5.5*
13 - Internet / On-line / E-commerce / Information technology	21	*14.5*
14 - Knowledge management / Learning techniques	18	*12.4*
15 - Knowledge spillover / Transfer	16	*11.0*
16 - Management / Change management / Organisational development	10	*6.9*
17 - Models / Theory / Frameworks	42	*29.0*
18 - Motivation factors	12	*8.3*
19 - Networks	17	*11.7*
20 - Organisational culture / Structure	23	*15.9*
21 - Performance factors / Productivity / Continuous improvement	20	*13.8*
22 - Project management	2	*1.4*
23 - R&D / Venture capital / Resource limitations	9	*6.2*
24 - Strategic orientation / Marketing orientation	46	*31.7*
25 - Small versus Large firms characteristics	10	*6.9*
26 - Supply chains / Logistics	2	*1.4*
27 - Technical change / Technological change and/or challenges	9	*6.2*
28 - Technology transfer	4	*2.8*
29 - Training & Education	12	*8.3*
30 - Other	2	*1.4*

Characteristics are important The results in Table 2.9 indicate several dominant research areas and emerging themes within the literature sample. They include: characteristics, both personal and business (37.2 per cent); strategic and marketing orientation (31.7 per cent); competitive advantage and customer service (31.0 per cent); and models, theories and frameworks related to innovation processes (29.0 per cent). Moreover, papers focusing on characteristics spanned a range of areas from personal motivation, values and backgrounds through to business attributes, capabilities and orientations. For example, Brickau, Chaston and Mangles (1994) undertook a comparative study investigating differences in business characteristics between small German and UK food processing companies operating within the single European

market. The authors found significant differences in areas such as product quality, strategic orientation and managerial competencies. Alternatively, the majority of papers researching entrepreneurship (25.5 per cent) were primarily focused on personal characteristics and behaviours. For example, Davidsson (1991) developed a model based on three major determinants which motivate continuing entrepreneurial behaviour, with these being ability, need and opportunity. It was not surprising that entrepreneurship as a research area featured prominently given it is inextricably linked with innovation (Drucker, 1994), discussed next.

Entrepreneurship linked with innovation According to much of the literature focused on entrepreneurship, the entrepreneur is inextricably linked with innovation (Drucker, 1994; Frederick, Kuratko, & Hodgetts, 2006; Hisrich & Peters, 2002). The pioneer of innovation research, Joseph Schumpeter, was the first to make the link between entrepreneurship and innovation; and Peter Drucker has posited that entrepreneurs employ innovation as a specialist kind of tool. However, it is wrong to assume that unless you are an entrepreneur you are unable to be innovative, as numerous research studies and text books confirm that innovation occurs outside the realms of entrepreneurship (Dodgson, 2000; Tidd, et al., 1997). A common perception is that entrepreneurs do drive innovation by seeking out, and exploiting, new opportunities (Drucker, 1994). For example, a study by Michael and Pearce (2009) proposes that governments wishing to drive their country's economy should have clear policy goals towards stimulating innovation by supporting entrepreneurship. Indeed, entrepreneurship is an important aspect when considering innovation research; hence, papers with an entrepreneurship research focus are included in the literature sample. In brief, strong links exist between entrepreneurship and innovation for building a business's innovative capabilities, as do collaboration activities, discussed next.

Building capabilities through collaboration Another important theme which emerged from the research literature was the link between collaboration and innovation. Represented by 26.9 per cent of papers in the literature sample, collaboration is deemed an essential activity for building internal business capabilities, particularly in terms of acquiring new expertise and external knowledge. According to Dodgson (2000), collaboration 'involves shared commitment of resources and risk by a number of partners to agreed complementary aims' which can ultimately 'lead to *positive sum*

gains in internal activities' (pp. 166-167). Similarly, a paper investigating the importance of strategic alliances in the development of small technology firms by Forrest (1990) found collaboration was 'an explicit part of the firm's development plan' (p. 38). Consistent with these findings, Hyland and Beckett (2005) propose the use of a collaborative framework to provide a systematic approach to the management and support of collaborative focused innovation; albeit, they contend participating businesses require a particular business culture supportive of the collaborative approach. In brief, collaboration is an important factor in helping build innovative capabilities through acquired expertise, and as a source of external knowledge; however, it does have limitations, discussed next.

There are several barriers which could impede successful collaboration between small businesses. These barriers include: the effects of integration complexities; organisational barriers; trust related issues; and resource restrictions for ongoing learning. The findings of this thesis indicate limited collaboration activity within the small business sample interviewed; discussed further in chapter 4. Importantly, a discussion with the Chief Executive Officer of a disability services provider, for example, indicated their reluctance to collaborate with other similar service providers for fear of losing their intellectual capital – a key component of their competitive advantage. Collaboration activities are certainly one way for small businesses to build on their internal innovative capabilities, offering an effective way to overcome resource limitations that can impede innovation development; whereas, it also has associated risks such as loss of intellectual property rights. In brief, collaboration is a practice that needs to be systematically managed for all parties to benefit; whereby, the organisational culture between collaborators must be aligned, and high levels of trust maintained for collaborative partnerships to thrive. Next, the importance of organisation culture in driving innovation is discussed.

Adopting the right culture The final two important research areas from the review findings are adoption processes (17.9 per cent) and organisational culture/structure (15.9 per cent). First, in terms of adoption processes, Rogers's (2003) research on the diffusion of innovation processes emphasises the importance of adoption for driving innovation throughout the business community. Accordingly, his Adopter Categorisation on the Basis of Innovativeness model found early adopters of innovation

accounted for 13.5 per cent of innovators, with a further 34 per cent of innovation adopters classified as the early majority innovators. Second, adoption of ideas, knowledge and products is deemed to be an important, if not crucial, aspect for enabling innovation to occur (Damanpour, 1991; Damanpour, Szabat, & Evan, 1989; Dewar & Dutton, 1986; G. W. Downs & Mohr, 1979). In a research paper that analysed motivating and inhibiting factors related to adoption of e-commerce practices in Chinese firms operating in New Zealand, Chen and McQueen (2008) found adoption rates were heavily influenced by three out of four of Hofstede's cultural value dimensions. The cultural value dimensions with the greatest influence are large versus small power distance, individualism versus collectivism, and strong versus weak uncertainty avoidance (Hofstede, 1984; Nankervis, Compton, & Baird, 2002). Importantly, personal cultural background can also influence a business's organisational culture, discussed next.

The personal cultural background of an individual can directly influence how innovation and adoption rates are determined within a business environment. For example, research by Gudmundson, Tower and Hartman (2003) found organisational culture, ownership structure and the organisation's primary customers are predictor variables for the organisation's innovation tendencies. The authors found that taking into account one's personal cultural background, combined with the organisational culture of the business, will determine how quickly and effectively innovative processes, products and procedures are adopted. Culture, basically an internal perception guided by country-specific beliefs within people's minds, and therefore becomes crystallized within the businesses, institutions and tangible products of a society(Hofstede, 1984); which then reinforce the prevailing mental attitudes that create an internal business culture. Thus, the factors within Hofstede's cultural dimensions play an important role towards influencing how businesses in different countries innovate. For example, anecdotally the United States manufacturing sector is known as the great innovator, whereas Chinese manufacturing is often referred to as the great imitator. In brief, adoption of innovations entails a particular approach and attitude, something directly attributable to the culture of both the business and individual.

Summarising the SLR findings

A summary of the SLR sample findings are as follows:

- **industry coverage** – 35.9 per cent of the papers researched a multiple industry sample, and the next highest frequency was manufacturing with 16.6 per cent; whereas, 19.3 per cent of papers were non-specific as a result of being literature or policy reviews;
- **methodologies applied** – qualitative research methods were the most popular approach (used by 23.4 per cent of papers), quantitative methods accounted for 19.3 per cent, while 15.9 per cent of papers employed a case study approach;
- **data collection methods** – in-depth interviews were used by 16.6 per cent of papers, secondary data from government bodies or industry associations accounted for 15.9 per cent, mail-out surveys were used by 15.2 per cent, followed closely by research literature reviews with 14.5 per cent of the sample;
- **country or region** – the two dominant countries of research focus were the United States and United Kingdom with 24.8 per cent each, the next highest was the European Union (including Ireland) with 17.2 per cent; whereas, a multi-country research focus accounted for 12.4 per cent, followed by Australia with 8.3 per cent;
- **analysis techniques** – the highest proportion of papers (with 33.1 per cent) used content/thematic or discourse analysis, multiple or combined methods were used by 24.1 per cent, and 12.4 per cent of papers used comparative tables;
- **research areas and emerging themes** – personal and/or business characteristics was the feature of 37.2 per cent of papers, strategic/marketing orientation and competitive advantage/customer service featured in 31.7 per cent and 31.0 per cent respectively, followed closely by innovation models/theory/frameworks with 29.0 per cent, while building capabilities/collaboration was the focus of 26.9 per cent.

In summary, the application of the SLR process was an extremely useful learning process; albeit, it proved to be an extremely labour intensive way of conducting a literature review. While extolling the virtues concerning rigour, replicability and minimising researcher bias by using the SLR process (Kitchenham, 2004; Tranfield, et al., 2003), I concede a panel of academic experts in the research area would have made the development and implementation stages less complicated. One downside with the process related to the simplistic search strings used to search the electronic databases; it became apparent that many important papers did not make it into the literature sample. Nevertheless, given that an a priori review of the research literature was undertaken to prepare the initial thesis statement, it is argued that a relevant cross-section of the wider

research literature has been reviewed; thereby, leading to an excellent, evidence-based, grounding in small business innovation research. Tranfield et al. (2003) contend the primary function of using the SLR process is to produce an evidence-based grounding of the research area under study; hence, the SLR process undertaken has produced a good output, which is complemented by the a priori literature review. Hence, the SLR process has been both insightful and informative; albeit, the process requires a group approach for the best results to be obtained. Next, the findings from the combined literature review are discussed.

2.5 BACKGROUND OF INNOVATION RESEARCH

The best way to obtain a complete, and concise, picture of any research area is to conduct a comprehensive review of the extant research literature. The purpose of any literature review is to 'describe, summarise, evaluate, clarify and/or integrate the content of primary reports' (Marsh, 2006, p. 2). However, before applying the SLR process, described as an evidence-informed management knowledge approach (Tranfield, et al., 2003), the researcher must first ascertain what to review by becoming familiar with the topic area through a preliminary literature review process. The findings from this preliminary review provide the foundations, or road map, for an evidence-based approach. Using this road map guides the way for development of the primary literature research instrument, the SLR process, because the systematic approach is argued to be a 'fundamental scientific activity' (Mulrow, 1994 as cited in Tranfield, et al., 2003, p. 209). Therefore, combining the traditional narrative approach with the systematic approach added both depth and rigour to this literature review. Next, some of the identified difficulties associated with innovation research are discussed.

Research difficulties As discussed in chapter 1, one of the difficulties associated with innovation research is the lack of universal consensus concerning a clear definition of the different types of innovation (Garcia & Calantone, 2002; Hyland & Beckett, 2005; E. Rogers, 2003). For example, Downs and Mohr (1976) assert the various conceptual issues underpinning this definitional difficulty stem from the lack of a 'unitary theory' of innovation (p. 701), where distinct innovation types are best explained by their own distinct theories. The authors further contend that researchers have created definitional confusion and ambiguity by attributing 'too many different meanings' to the innovation

construct (G. W. Downs & Mohr, 1979, p. 385). Similarly, McAdam, Stevenson and Armstrong (2000), in their study investigating links between continuous improvement (CI) and innovation as a change management philosophy, report that 'Like CI there is a substantial range of opinions and ideas about what constitutes innovation' (p. 140).Nevertheless, there has been progress made toward a set of accepted definitions which adequately cover the various complexities associated with aspects of innovation which include: levels of newness; forms of value creation and adoption process. While these aspects may appear vague, it needs to be remembered that innovation comes in many forms, which leads to more debate about the differing typologies of innovation that abound, discussed next.

Further compounding the definition situation is the distinction between what constitutes radical and incremental innovation: are they a typology or ends of a process continuum? For instance, how do you define a completely new (radical) innovation that is developed incrementally over time due to resource limitations? Gacia and Calantone (2002) argue the use of interchangeable constructs has perpetuated 'incongruent categorisations of innovation typology' (p. 110); thereby creating confusion within the empirical research about the type of innovation being researched. More importantly, the lack of an accepted definition also contributes to difficulties associated with accurately measuring innovation (Dodgson & Hinze, 2001; Jensen & Webster, 2004). But just as there is more widespread consensus about the definitional aspects, there is also greater acceptance pertaining to the various innovation typologies. For example, some of the widely acknowledged innovation typologies include; technological, administrative, organisational, discontinuous and reinnovation to name but a few. Hence, while there are accepted typologies for categorising different types of innovation, there remains a lack of a universally accepted definition; which according to Downs and Mohr (1979) creates confusion and ambiguity across, and within, innovation research findings. Furthermore, there are several other significant difficulties identified related to innovation research that required special attention, which include:

- practitioner's understanding of innovation;
- collection of innovation-related financial data;
- lack of accurate and/or appropriate innovation measures;
- distinction between innovation and adoption – the time effect; and,

- the lack of data related to respondents' education levels.

Consequently, these five difficulties also relate to significant knowledge gaps in the literature reviewed, discussed next.

Difficulties of defining innovation One of the main research difficulties concerns the definition, and general understanding, of what constitutes innovation (Bhattacharya & Bloch, 2004). Moreover, evidence suggests confusion remains in defining the differences, and measuring the associated outputs, between the dichotomous categorisations of radical and incremental innovation (Garcia & Calantone, 2002; Otero-Neira, et al., 2009). This uncertainty further continues with the dichotomisation between product and process (Prajogo, 2006). Indeed, radical innovation implies massive changes or major breakthroughs, whereas incremental innovation implies gradual or continual improvement. For example, Otero-Neira et al. (2009) posit 'radical innovations make the current knowledge obsolete in terms of competitiveness, whereas incremental innovations do not necessarily increase existing knowledge of firms' (p. 218). Nonetheless, it is now accepted that radical and incremental innovation are opposite ends of an innovation continuum; a classification construct underpinned by the notion that innovation activities constitute a form of discontinuity within a business's operational development and adoption processes towards a competitive advantage, discussed next.

There is strong support within the business research community that innovation is portrayed as the new way of producing sustainable competitive advantage (J Weerawardena, 2003). The behavioural antecedents of innovation such as risk taking, adoption propensity and learning capabilities can all contribute towards attaining a sustainable competitive advantage. However, Garcia and Calantone (2002) purport the ambiguity surrounding innovation classifications makes it difficult to compare innovation research findings from different studies; a situation that appears to be prevail in the small business community when trying to ascertain what innovation means at the practitioner level.For example, during the primary data collection phase many respondents said sustainable growth was more about maintaining a customer service focus, as opposed to the 'bells and whistles' that innovation may offer. Supporting this perspective, Lin and Chen (2007) argue that businesses may ruminate about the inherent benefits of innovation; however, the authors argue innovation does not

automatically increase sales, and that ‘innovation is not a panacea’ (p. 125) for business underperformance. An ABS report posits that ‘although innovation is an important distinguishing feature of our society, it has been poorly understood’ (Trewin & Paterson, 2006, p. 3). Nonetheless, innovation is generally recognised as a way of directly creating value for the business, and for their customers indirectly (J. Weerawardena, 2003); giving rise to the debate about whether the outputs from innovation activities actually have to be commercialised in some way, discussed next.

Joseph Schumpeter postulated that innovation is primarily concerned with the commercialisation of inventions. Highlighting innovation processes as an economic driver, Schumpeter defined innovation as ‘the commercialisation of inventions…the basic force behind capitalist market economies’ (Strebel, 1992, as cited in de Wit & Meyer, 2001, p. 401). However, because of the wide variety of forms innovation can take, it is acknowledged that not all innovations can actually be commercialised; albeit, innovation does add, or create, intrinsic value in some way through cost saving measures (Garcia & Calantone, 2002). For example, innovation within management practices may not lead to a new process that can be commercialised, whereas the intrinsic value added to the business would be more cost-effective, or time-efficient, operational procedures that result in a lowering of operating costs. Thus, former CEO of General Electric (GE) Jack Welsh, for example, is reported as saying that GE’s extraordinary financial performance was mostly due to management innovation (Birkinshaw, Hamel, & Mol, 2005). In brief, the value created by an innovation is not necessarily associated with the end goal of commercialisation; whereby, the inherent value created might be new knowledge, additional expertise or acquired skills that add value to the business by increasing its innovative capabilities. However, what is consistent when defining innovation is the concept of newness, discussed next.

Seeking a clear definition of new The one consistent term attributed to the definition of innovation is the word new. For example, the word is prominent and clearly identified in Schumpeter’s five categories of innovation, which are:

1. The introduction of a new good – that is one with which consumers are not yet familiar – or of a new quality of a good.

2. The introduction of a new method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially.
3. The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
4. The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
5. The carrying out of the new organisation of any industry, like the creation of a monopoly position (for example through trustification) or breaking up of a monopoly position. (Schumpeter, 1934)

The single common theme linking each category relates to the word 'new'; whereas, the concept of newness – how new – is not defined or expanded upon in any way. Therefore, the concept of newness, and new to whom, was a major obstacle in trying to narrow down a definitive definition of the innovation construct (Garcia & Calantone, 2002; Johannesson, et al., 2001); whereas this issue has now reached a modicum of consensus. For example, Downs and Mohr (1979) underpin their theory of innovation by asserting new only pertains 'to the adopting agent, and not necessarily to the world in general' (p. 385). Nevertheless, the etymological origin of the word innovation is the Latin term '*ínnovare*' meaning to make something new (Tidd, et al., 1997); therefore, it seems logical for the concept of new and/or newness to be accepted as integral to the overall definition of the innovation construct. In brief, by accepting the Latin origins of the word innovation, it is reasonable to conclude the definition of is related to the concept of new and/or newness which is intrinsically linked to value creation. Next, an examination of some of the parent theories on defining innovation is discussed.

2.5.1 Parent theories

What is in the wider literature It appears quite obvious that the word new, and the concept of newness, is integral to the definition of innovation. However, uncertainty remains as to what newness means when applied to the various forms innovation can take. For example, if an alternative application for an existing pharmaceutical drug is found, such as with the pain killer Aspirin now being used as a blood-thinning agent, does this constitute an innovation? A more contemporary definition for changed

application of a single product alludes to this as an altered changeover status. The freedictionary website states: ‘Innovation is typically understood as the introduction of something new and useful, for example introducing new methods, techniques, or practices or new and altered products and services’. The ABS defines innovation as: ‘the process of developing, introducing and implementing a new or significantly improved good or service or a new or significantly improved process’ (ABS, 2003, p. 2). Further clarification is provided on the next page: ‘...an adaption of existing technology to a new use, or may be non-technological in nature’ (ABS, 2003, p. 4). In brief, an expanded definition of innovation is centred on adaptation, or significant improvement, of something current to a new use; whereas, the term ‘new’ still creates levels of uncertainty. How people actually perceive what is new, new to whom, and how new, is discussed next.

The problem with defining what is new The definitional problem occurs because no real delineation exists between what constitutes an innovation as being new, how new, and new to whom (Johannesson, et al., 2001; Vermeulen, De Jong, & O'Shaughnessy, 2005). For example, is an old invention that reappears in the same industry, but with a different application than what it was originally designed for, considered an innovation? Or is the invention simply an example of adaptation of an old idea reengineered, or reinvented, for a new era (Henderson and Clark, 1990 as cited in Johannesson, et al., 2001; E. Rogers, 2003)? Moreover, old inventions reappearing in new, unrelated, industries demonstrate how the lines can be easily blurred when assessing whether something is new or not. To address this conundrum E. Rogers (2003) proposes ‘a standard classification scheme so that the perceived attributes of innovations can be described in universal terms’ (p. 223). In brief, the overarching concept of newness, new to whom, and how new is certainly an important aspect in defining what constitutes an innovation; although, uncertainty continues when an innovation is actually perceived as reinvention, discussed next.

Uncertainty attributed to reinvention The term reinvention by its very nature gives rise to further complications when trying to define innovation. The process of reinvention means taking something old and modifying, or adapting, it to suit a current application (Baard & Watts, 2007; E. Rogers, 2003). The reinvention concept appears to be consistently overlooked by the recent innovation research literature. For example,

only one paper of the 145 reviewed in the SLR sample, authored by Baard and Watts (2007), specifically focused on the construct of reinvention and its links to small business innovation. Indeed, the importance of reinvention to innovation was completely ignored by innovation diffusion researchers until the 1970s according to E. Rogers (2003). The concept of reinvention is 'the degree to which an innovation is changed or modified by a user in the process of adoption and implementation' (p. 17). Furthermore, E. Rogers asserts the early innovation adopter's reinvention behaviour was viewed as 'unusual' and treated as 'noise' by the early innovation researchers. It was not until behavioural attributes and personal attitudes were deemed important business influences that the construct of reinvention started to get noticed. In brief, reinvention was consistently overlooked in innovation diffusion research because innovation adopters were considered as 'passive acceptors of an innovation, rather than active modifiers and adapters of a new idea' (E. Rogers, 1995, p. 174). Next, the difficulties associated with the collection of financial data related to innovation processes are discussed.

Financial data collection Financial data measures are considered an important element necessary for innovation research, due in part because they are incorporated as proxy measures for innovation inputs and outputs relative to R&D activities (X. B. Li & Mitchell, 2009; Egils. Milbergs & Vonortas, 2005; M. Rogers, 1998). Conversely, it is well documented that it is difficult to obtain financial data from small businesses generally (Dess & Robinson, 1984; Georgellis, et al., 2000). There remains considerable debate surrounding the effectiveness of using financial data as a proxy measure for R&D activities; therefore, questions remain about the accuracy of such a proxy measure for innovation (Dodgson & Hinze, 2001; Lin & Chen, 2007; M. Rogers, 1998). One of the first significant research issues identified from the guidelines within the Oslo Manual (OECD/Eurostat, 2005) were the inherent difficulties involved in collecting financial data, and then interpreting the data, relative to innovation processes. For example, it is reported 'information on innovation expenditures is normally not specified in a firm's financial accounts' (OECD/Eurostat, 2005, p. 40). Another aspect of concern, according to Lin and Chen (2007), is many researchers rely on respondents self-reporting their financial data performance; whereby, such data could potentially be subjectively embellished. This would make the business appear either more profitable or more actively engaged in innovation and R&D activities than was the actual reality.

However, there is also the problem of accurate record keeping of financial information related to innovation expenditure, discussed next.

A second problem associated with financial data accuracy is one of apportioning expenditure specific to innovation-related processes. In particular, there are inherent difficulties in accurately tracking and apportioning expenditure as a measure for incremental innovation activities (Hadjimanolis, 2000). For example, there are obvious difficulties in measuring minor, yet continuous, modifications to service delivery improvements, a major source of incremental innovation, where the attributable expenditure may be negligible (Prajogo, 2006). Additionally, there is also the problem where the accounting, or book, value of intangible assets related to innovation processes does not accurately represent the actual market value of the investment made (Bosworth & Rogers, 2001; M. Rogers, 1998). For instance, innovation process expenditure should include the man hours devoted to a specific project; whereas, the anecdotal evidence from this thesis sample indicates this is rarely recorded, or even considered an expenditure item. In brief, the collection of financial data for small business innovation research holds limited value due to the potential inaccuracies it contains, and the inherent unreliability of the recording methods. Further, in terms of apportioning financial expenditure there is a perceptual problem of what small business operators perceive R&D activities to entail, discussed next.

What constitutes R&D? How much R&D activity is undertaken by the average small business, particularly retail and personal services businesses, depends on the operator's definition of R&D. For example, many of the respondents interviewed indicated they were unsure of what processes constituted R&D activities. Moreover, a number of the papers reviewed, including Rothwell (1985), argue that a sizeable percentage of small businesses are severely limited by resource constraints when undertaking R&D investment (Hadjimanolis, 2000). Such issues make it difficult to generalise about R&D activity in small businesses, particularly as the levels can differ considerably from sector to sector. The findings from an ABS report conclude 'that innovation and R&D expenditure intensity is strongly focused on a small proportion of the business population' (Trewin & Paterson, 2006, p. xi). In brief, the general perception indicates that financial data collected from small businesses is unreliable in terms of its relationship to innovation processes; therefore, no financial data connected to

innovation processes or R&D activities was collected for this thesis. Aside from financial data unreliability, there is the problem of measuring innovation processes in small business environments, discussed next.

Measuring without measures A considerable area of research uncertainty concerns the lack of innovation measures for use within the small business sector. Anecdotally, innovation is described as driving the information age of the twenty-first century, yet debate continues around how innovation processes can be accurately measured in different business contexts (Jensen & Webster, 2004). Part of this debate centres on the problem of measuring intangible assets such as the value of goodwill, intellectual capital and knowledge creation (Bosworth & Rogers, 2001). For example, how is it possible to measure, and in turn attribute a monetary value to, the intellectual capital and skill set of a sole operator with 40 years of experience in a single industry? Moreover, the important contribution small businesses make within communities, particularly in small and rural communities, as both employers and skilled knowledge repositories, is another hard-to-measure factor. Often such businesses are overlooked as being innovators. Many rural businesses would not have the resources to take out a patent, nor would they need to engage in constant R&D activities to remain competitive if they are the only business of their type servicing the local community. Thus, businesses like this are often viewed as non-innovators, but it is only because there are no appropriate measures suited to their particular circumstance. Similarly, how one measures a reinvented radical innovation is discussed next.

One of the difficulties in trying to measure innovation concerns the fact innovation can be both new and incremental, or it may be reinvented and radical. For example, an old product may be continually developed incrementally, with gradual improvements and alterations over time, until the old product undergoes metamorphosis into a new product now adapted for a totally new application (Birkinshaw, et al., 2005; von Hipple, 1988). This single process can be defined as two distinct approaches; albeit, with similar principles underpinning each approach. The first approach is defined by von Hipple (1988) as the user/consumer-dominated approach and the second approach is defined by E. Rogers (2003) as the process of reinvention, but the final outcome of both processes is virtually identical. Further, Dodgson and Hinze (2001) argue that innovation can be considered both a process and an outcome; therefore, the development of innovation

measures for small business needs to consider two separate approaches. The first approach must focus on factors relevant to innovation processes; for example, based on a composite of adoption rate timeframes linked to new products, processes, services or technology introduced into the business. The second approach is similar to current methods which focus on the innovation outputs such as number of new products and services. In brief, there is no one single method for accurately measuring innovation due to the complexity of the processes involved (M. Rogers, 1998); however, there is a definite need for the development of innovation measures suited specifically for small businesses. The measurement and research complexity of innovation arises from tangible and intangible outputs, discussed next.

Finding measures for the immeasurable The final outputs of innovation processes can take the form of both tangible and intangible outputs. For example, tangible outputs can include: new product packaging; creative design concepts; patent and trademark registrations; and, promotional and marketing strategies. All such outputs can be easily tracked and measured for performance improvements. Alternatively, intangible outputs cover such diverse areas as: organisational structure improvements; management decision-making behaviours; nurturing of an innovative culture; knowledge management procedures; intellectual capital creation; and, sourcing ideas through networking and collaboration. These are areas where performance improvements may be difficult to track, and harder still to gainfully measure, partly because the intangible benefits are usually only seen over extended periods of time. For example, it is acknowledged that organisational culture can influence how innovation is implemented and managed (Hyland & Beckett, 2005), yet no measures exist to actually quantify this in a meaningful way. Thus, it is too simplistic to argue innovation is only about the commercialisation of inventions, particularly when experiential knowledge plays such an important role in driving innovation, discussed next.

One source of debate complicating the development of metrics for measuring innovation is the inability to accurately measure various intangibles, such as knowledge. Knowledge is an intangible asset that contributes to related innovation outputs which include: knowledge management (Nonaka & Takeuchi, 1995); intellectual capital (Marr & Moustaghfir, 2005); and the learning ability of organisations (Senge, 1990; J Weerawardena, 2003). Importantly, interlinking these

aspects lays the foundations of another important element that drives innovation processes: absorptive capacity – a learning process for building internal innovative capabilities (Cohen & Levinthal, 1989, 1990). For example, Nonaka and Takeuchi (1995) make distinctions between two forms of knowledge, which they define as tacit and explicit knowledge. The authors contend that explicit knowledge can be easily communicated and shared among workers, whereas tacit knowledge cannot. Further, the authors assert that tacit knowledge has two distinct dimensions, a technical and a cognitive dimension, discussed next.

Distinguishing knowledge In distinguishing between different types of knowledge, Nonaka and Takeuchi (1995) define explicit knowledge as being formalised and systematic. The authors contend that such knowledge can be easily represented by words or numbers, meaning it can be easily communicated and shared. Tacit knowledge, on the other hand, is more personal and is based on experiential learning making it relatively hard to formalise and document; consequently, articulating and sharing it with others becomes more difficult (Nonaka & Takeuchi, 1995). Furthermore, the authors posit that tacit knowledge has two dimensions. The first dimension relates to what the authors describe as 'know-how', or the technical dimension often associated with master craftsmen. This dimension is predicated on skills acquired through years of practised expertise. The second dimension is what they describe as the cognitive level of tacit knowledge, made up of schemata, mental models, belief systems and personal perceptions. Specifically shaped directly by cultural background and personal upbringing, making them innate to our thought processes, people are most likely completely unaware of their influence in the way we perceive the world. Subsequently, this dimension of tacit knowledge is difficult to articulate to another person, particularly if the person is from a different cultural background or upbringing. In brief, even though tacit knowledge is extremely difficult to measure in any meaningful way, both tacit and explicit knowledge are crucial elements for the construct of absorptive capacity, discussed next.

An essential element for building innovative capability within a business is the construct of absorptive capacity; a process of acquiring and absorbing new knowledge. Its foundation is based primarily on a business's ability to absorb, integrate and exploit external knowledge. While Cohen and Levinthal (1990) coined the most widely cited

definition for the construct of absorptive capacity, Zahra and George (2002) reconceptualised it as ‘a dynamic capability pertaining to knowledge creation and utilisation that enhances a firm’s ability to gain and sustain a competitive advantage’ (p. 185). It is a process encompassed by the business’s ability to combine its internal knowledge with assimilated external knowledge, to further extend its capabilities for exploiting, and building on, its innovative capacity and capbilities (C. Gray, 2006). For example, Massa and Testa (2004) contend ‘newly acquired knowledge, once integrated with previous internal knowledge of the firm, creates new knowledge that may give rise to improvements and innovations’ (p. 610). Subsequently, this construct has spurred a major research field with respect to innovation management and measurement; whereby, the field of knowledge management (KM) became an important focus for innovation research. In brief, having the ability to absorb external knowledge as a way of building a business’s innovative capabilities sounds simple; however, to make the most efficient use of knowledge for creating additional value it must be effectively managed, discussed next.

Managing what is known The study of knowledge management practices has become a major research discipline, particularly within innovation research. The discipline, which incorporates the area of intellectual capital (IC), is acknowledged as an important factor for growth and value creation in business operations. Moreover, IC is deemed an appropriate way to benchmark an organisation’s knowledge management performance (Marr, 2004). For example, Marr (2004) postulates that intellectual capital is now universally acknowledged as being a ‘critical source of true and sustainable competitive advantage’ (p. 559). There is widespread discourse, anecdotally, that knowledge has become a new tradeable resource within the global business environment. However, intangible assets such as knowledge remain extremely difficult to accurately measure, partly because they are more related to the people within the business than the business itself (Hutchinson & Quintas, 2008). Thus, concern remains about the efficacy levels of developing potential measures to measure knowledge and absorptive capacity of a business (C. Gray, 2006). In brief, the importance of knowledge to drive a business’s innovation capability is undisputed, but the accurate measurement of knowledge is still plagued with uncertainty. Similarly, R&D expenditure and patent counts as proxy measures of small business innovation suffer the same uncertainty, the advantages and disadvantages of which are discussed next.

Finding a rule on measures When it comes to the measurement of innovation processes, two of the more widely used proxy measures are R&D expenditure and patent counts. The main advantage of using R&D expenditure as a measure, or activity indicator, of innovation according to Dodgson and Hinze (2001) is that such data is regularly collected internationally. For example, large research organisations such as the OECD, UNESCO and EUROSTAT make their data readily available for analysts and researchers alike. One of the inherent difficulties of using R&D expenditure to broadly measure innovation processes is associated with the expansive nature of activities where no cost is involved (Jensen & Webster, 2004). Alternatively, M. Rogers (1998) contends this difficulty can be overcome by distinguishing between the inputs and outputs of innovation processes. Thus, in terms of measuring innovation inputs, R&D expenditure is widely accepted as the most extensively used proxy measure for innovation processes. Nevertheless, using such a measure is not without certain limitations (Hoffman, et al., 1998; Jensen & Webster, 2004): three of these limitations are discussed next.

There are three significant limitations to the use of R&D expenditure to measure innovation in small business environments. The first limitation, according to M. Rogers (1998), is similar to the uncertainty surrounding the definition of innovation itself; whereby 'the precise definition of R&D is subject to some debate' (p. 12). The second limitation, which appears to be at odds with the previous comments from Dodgson and Hinze (2001), is the difficulty in collecting financial information related to R&D expenditure specific to innovation processes. For example, the Oslo Manual (OECD/Eurostat, 2005) reports 'innovation expenditure questions are also among the most difficult and time-consuming to answer' (p. 99). The final limitation of R&D expenditure as a proxy measure is whether such financial information is available, or accurate. There remains concern about whether such financial information is actually recorded specific to R&D activities (Jensen & Webster, 2004). Further, assuming such financial data is available, how accurately is the expenditure apportioned relative to the various R&D activities specific to a single innovation (Trewin & Paterson, 2006)? In brief, the use of R&D expenditure as a proxy measure of innovation processes may be appropriate for large, resource-rich businesses; however, it appears to be an inappropriate measure in the context of small businesses (Hadjimanolis, 2000; Oakey &

Cooper, 1991). The use of patent counts as a proxy measure of small business innovation is discussed next.

What counts may not The second most widely used proxy measure for innovation is the use of patent counts, considered an innovation output. The use of patent count data is intrinsically linked to research on intellectual property (M. Rogers, 1998). Patent counts are widely used as a measure in several other business and management research areas including: business cooperation (Shan, Walker, & Kogut, 1994); competition and growth (Greenhalgh & Rogers, 2004); knowledge spillovers (X. B. Li & Mitchell, 2009); and entrepreneurship and performance (Helmers & Rogers, 2009). Importantly, similar to R&D expenditure, the use of patent counts as a proxy measure of innovation processes within small business environments has several limitations; however, they do play an important role in protecting intellectual property rights (IPRs) across all business sectors. In brief, patents can act as an important revenue stream, particularly in the form of licensing the business's IPRs (Greenhalgh & Rogers, 2007); albeit, they are not truly reflective of a business's innovative capabilities, discussed next.

Patent registrations are not indicative of a business's innovative capabilities, argue Greenhalgh and Rogers (2007), due to the emergence of 'patent troll' companies (p. 4). Such companies actively search and acquire patents with the intent of enforcing the IPRs on potential infringers; in addition, transacting licensing agreements without having undertaken any of the actual R&D work involved. Companies like this would obviously have a high patent count; however, it is debatable whether these companies could be considered to be truly innovative. In brief, this issue highlights how using patent counts as a proxy measure for innovation processes could be misrepresentative of the real amount of innovation undertaken by the business who owns the patent. Another limitation of using patent counts as a proxy measure for innovation is that not all inventions are patented, discussed next.

Patent problems History shows not all inventions, nor their associated innovations, have the potential to be patented. According to M. Rogers (1998) 'not all commercially valuable ideas can or will be patented' (p. 14). The potential implications of this point are obvious. Firstly, a business that is highly innovative, for example, may simply be unable financially to afford to patent their many inventions; thereby, rendering them as a non-innovative business if patent counts is applied as an innovation measure.

Secondly, many of the inventions, products or designs patented vary greatly, not only in their quality but also in their commercial viability (Griliches, 1990); therefore, patents do not guarantee a commercial return on investment. For example, a patent does not specifically reflect the innovativeness of a business if it only patents a simple widget, compared to a business that patents a ground-breaking gene splicing device (Greenhalgh & Rogers, 2007). Additionally, franchising is an example of a successful business process model which has become increasingly popular in Australia; however, such business models are unable to be patented. In brief, there are various inventions, including management processes and uniquely customised business models, which have the potential ability to generate considerable value for their developer; however, many are unable to be patented. Indeed, patents can actually act on innovation in a negative way, discussed next.

A final limitation of patent counts in the context of measuring innovation processes is they can also act as an innovation inhibitor. For example, a patent's purpose is to provide IPRs protection for the inventor/developer of their invention or design. They prevent others from either using, or continuing the development of, the invention or design the patent protects. The result of this protection is that patents potentially inhibit further innovation development, in addition to severely restricting the knowledge spillover effect (M. Rogers, 2010). Importantly, Schumpeter's construct implies innovation is about commercialising inventions; however, the protection a patent provides may subsequently curtail further development of an invention that enables it to become commercially viable (M. Rogers, 1998). In brief, patent counts are unsuitable as a proxy measure for innovation in small business for several reasons: they are expensive and time consuming to obtain; they may not accurately reflect true R&D activity levels; and they potentially restrict further innovation development. Next, the blurred distinction between innovation and adoption are discussed.

Is adoption truly innovative? The next important research problem identified within the literature review concerned the practice of adoption as a way of characterising innovation. To clarify, the term adopt is defined as: 'take (idea etc.) from someone else; choose, take up; approve, accept' (1987, p. 14). Adoption in a business context is the practice of implementing others' ideas, products, processes or procedures into your own business. There was much debate about whether adopting someone else's ideas into

your own business constitutes innovation; whereas it is now widely accepted that adoption is an integral function within the innovation construct definition. For example, Downs and Mohr (1979) argue that the relative speed with which a business adopts new ideas is indicative of its level of innovativeness. Ultimately, if what is adopted is new to the operator and the business itself, then by definition this constitutes the act of innovation (Johannesson, et al., 2001; Vermeulen, et al., 2005). Furthermore, E. Rogers's (2003) innovation diffusion research indicates sequential time lags occurring between when an invention is initially commercialised, to when it emerges into the marketplace as a new innovation and is adopted by other users. There is a further time lag between when the innovation is taken up by early adopters to when it is widely adopted by a majority of users such as major competitors, other end-users and/or other industry sectors. Nevertheless, time is a relevant factor for determining the level of innovativeness associated with the adoption rate of any given innovation, discussed later in the chapter. Next, user driven innovation and adoption rates are discussed.

The research findings by E. Rogers (2003) that innovation adoption rates incurred a time lag corroborates Eric von Hipple's (1988) research on user-driven innovation. The focus of von Hipple's (1988) research was the concept of user-dominated innovation; whereby, end-users of a product make alterations to the original, and adapt it over time to suit new applications – a form of reinvention process. For example, hydration packs (or Camel Packs) were invented by a man who competed in long-distance summer bike races, who was also a paramedic. Taking an IV bag normally used to rehydrate patients, he developed the drinking system by sewing the IV bag to his shirt, and then using the plastic tubing to deliver the water while riding (von Hipple, 2006). Subsequently, von Hipple (2006) observed an average time-span of between five and seven years from the initial product release into market, through to the user redevelopment and launch of the new product. There are two distinct types of user innovation according to von Hipple (2006). The first 'is a user innovation when the developer expects to benefit from using it', while the second is 'manufacturer innovation when the developer expects to benefit from selling it' (von Hipple, 2006, p. 3). Subsequently, the developer can be either an individual or a firm; whereby, both are seeking to make improvements to an original invention, which in turn can instigate further innovation, discussed next.

A further dimension to end-user development of innovation through adaptation is where end-users seek to make significant improvements to existing products, processes or designs. According to Drazin and Shoonhoven (1996), for example, the entry of a dominant product design or service model into the marketplace invariably generates additional innovation within that field. Further, Pilzer (1991), among others, contends that a superior technological innovation would potentially produce exponential growth in terms of new and improved products; thereby, leading to further technological advancements (Drazin & Schoonhoven, 1996). Thus, early adoption rate timeframes of innovations by key industry influencers within a particular sector could act as a catalyst for a raft of new innovations centred on a single innovation. One recent example of this is Apple's highly innovative iPod music player, which not only spurred a range of imitators but led to associated innovations such as video and photo software development being incorporated into these music devices. In brief, innovation can be driven by end-users as they seek to adapt existing products to suit new applications; thereby, leading eventually to manufacturers refining the new innovations for release into the wider marketplace. Next, the multilevel perspective of innovation proposed by Drazin and Schoonhoven (1996) is discussed.

Taking a multilevel approach It can be argued that innovation is extremely complex because of its multifaceted constituent parts and different organisational approaches. There is no one singular aspect which drives the innovation process; therefore, it needs to be approached from a multilevel perspective. Subsequently, a multilevel approach was the focus of Drazin and Schoonhoven's (1996) review of several innovation research studies spanning the early 1980s to mid-1990s, the majority of which 'present integrated, multilevel models based on variables ranging from creativity to strategic focus' (p. 1066). The authors contend that prior innovation research has been somewhat limited by focusing primarily on two core assumptions: firstly, innovation produces useful outputs; secondly, organisational characteristics drive innovation. Their review incorporates a broad range of innovation-related perspectives from different studies which include: corporate strategy – where merger and acquisition activities inhibit internal innovation; organisational slack – where under-utilised resources promote innovation; large organisation impediments – where an absence of senior management support, internal cross-functional collaboration and sustained resource allocation hindered innovation; and creativity linkages – where creativity is a contextually

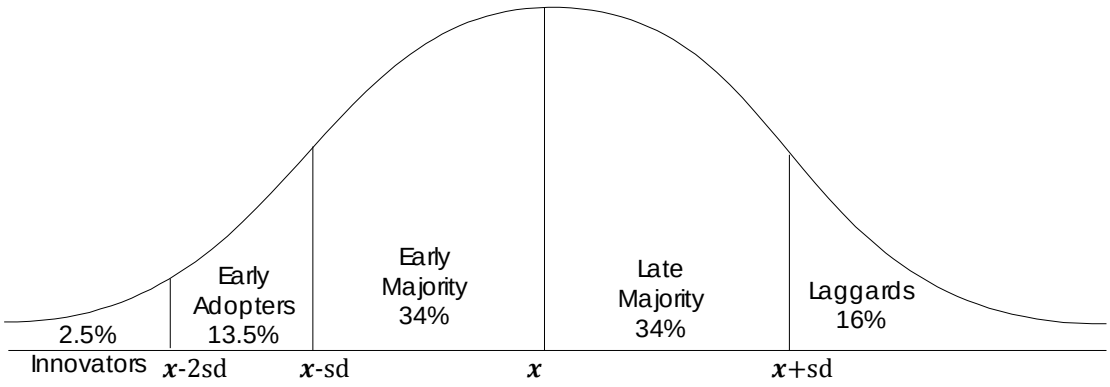
important link for innovation outcomes. In brief, the authors use their review findings to construct a multilevel innovation model on the effects of context on an organisation's ability to innovate. Next, the relationship between reinvention, adoption and innovation is discussed.

Given the basic definition that innovation concerns introducing something new or significantly improved, then it should hold that adoption of something new constitutes innovation. For example, adopters of innovation generally extol the virtues of reinvention, citing such benefits as greater flexibility, customisation to suit local situations, changing market conditions, and allowing for a more appropriate fit within the adopting organisation (E. Rogers, 2003). Thus, reinvention is widely recognised as a legitimate contributor to innovation activities (E. Rogers, 2003). Indeed, much of the innovation within the services sector is attributed to incremental innovation development (Hipp & Grupp, 2005; Prajogo, 2006); whereby, continual improvement of current practices, and the adoption of new practices, occurs regularly. The result of this continual improvement process further compounds the problem of trying to measure innovation attributable to adoption and/or reinvention. In brief, reinvention and adoption processes make significant contributions toward innovation processes generally; thereby, enabling businesses to cater for dynamic operating environments, address customer problems and capitalise on emerging consumer trends. These processes potentially create a competitive advantage for a business, discussed next.

Sustainable competitive advantage is achievable through adoption of innovations, both technological and non-technological (J Weerawardena, 2003). As a result, the use of adoption rate timeframes could become a potential measure for determining an innovator from a non-innovator business (G. W. Downs, Jr. & Mohr, 1976; 1979). In terms of gaining a competitive advantage, short adoption timeframes will potentially give a business the benefits of first-mover advantage over their competitors (Hanson, Dowling, Hitt, Ireland, & Hoskisson, 2002). For example, by establishing a benchmark timeframe of 12 months as the cut-off point, a business could be measured for the speed with which adoption of new innovations occurs within that timeframe; whereby, the shorter the adoption time, the more highly innovative the business is likely to be. Such a benchmark timeframe may encourage an adopter business to become more responsive in approaching new customer needs, or addressing problems, that arise from rapidly

changing circumstances (Drazin & Schoonhoven, 1996). In brief, short adoption rate timeframes of new innovations is one way for businesses to attain competitive advantage by gaining the first mover advantage. Further, E. Rogers (2003) developed a useful adoption rate time-series graph when he constructed the five categories of innovators, discussed next.

Time for adoption Frustrated by confusing terminology and loose methodologies for categorising innovation adoption, E. Rogers first developed his innovation adopter categories in 1958. E. Rogers (2003) worked on the premise that adoption rates could be categorised by varying degrees of innovativeness, illustrated in Figure 2.2, underpinned by 'the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of the social system' (p. 280). For example, he determined that innovation occurs continuously and therefore, by dividing adoption rates into distinct categories, gave rise to the formation of a conceptual classification device.



(E. Rogers, 2003, p. 281)

Figure 2.2 **Rogers's adopter categorisation on the basis of innovativeness**

Consequently, those businesses involved in the adoption and diffusion process of innovation can be categorised into five distinct groups: innovators (2.5 per cent), early adopters (13.5 per cent), early majority (34 per cent), late majority (34 per cent), and laggards (16 per cent). A brief summation of how E. Rogers describes each category is as follows:

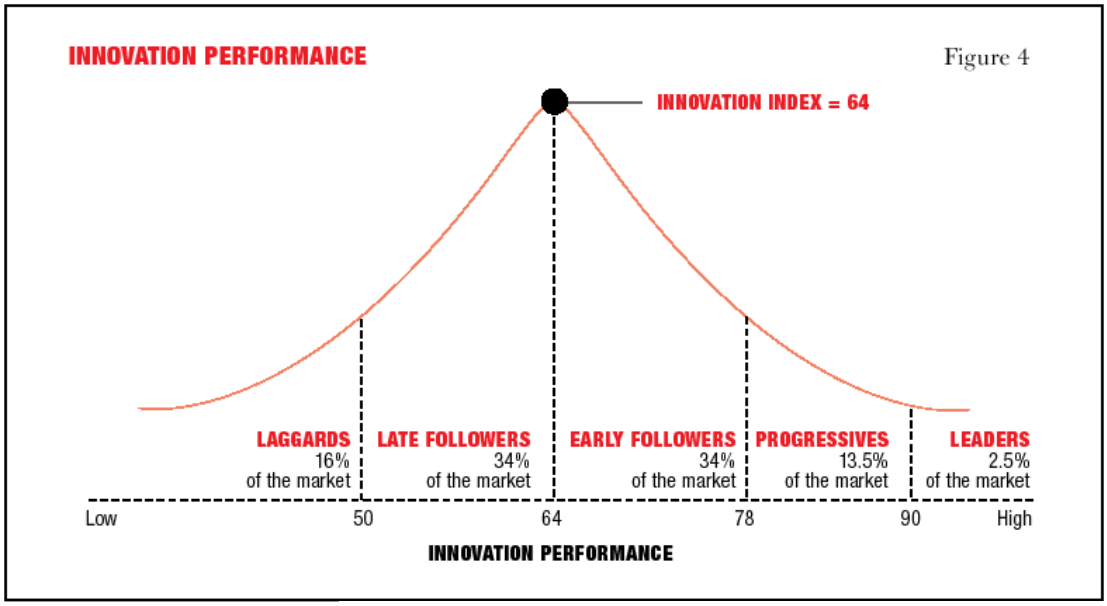
- innovators are the conduit of new idea flows into an existing system with a high propensity for risk, yet resilient in the face of setbacks;

- early adopters are primarily well-respected opinion leaders, high profile change agents whose subjective evaluations of new ideas acts as a stamp of approval;
- the early majority are an important driver of the innovation diffusion process, adopting a new idea before it reaches critical mass, yet conducting deliberate evaluation of the idea before complete adoption takes place;
- the late majority adopts new ideas at the point of, or just after, critical mass usually for reasons of economic necessity or peer pressure: they evaluate innovation with scepticism and caution; and,
- laggards are just that, they adopt last due to suspicious tendencies towards innovation change agents while resisting change generally, and approach new ideas with extreme caution.

Further, E. Rogers provides extensive detail on the various characteristics of each adopter category, covering such areas as socioeconomic characteristics, personality variables and communication behaviour; whereby, he concludes by noting the significant differences that exist between the early adopter and late adopter categories. His research developed what ultimately could be a valid predictive measure of innovative capabilities within the small business sector: the time it takes to adopt new ideas, products or processes. In brief, E. Rogers's five categories of innovation adopters provide an invaluable yardstick, or potential classification benchmark, for identifying adopters of innovation. Interestingly, his work on adopter categories itself appears to have been adopted, discussed next.

The adaption of adoption The concept of E. Rogers's (2003) adopter categories has itself been adopted almost five decades after it was first published. An Australian industry paper titled: *Igniting innovation performance: The Fujitsu Innovation Index 2006*, produced the exact figures detailed in E. Rogers's adopter categories in their Innovation Performance Index. Fujitsu Consulting Australia made these findings after surveying 178 Australian and New Zealand CEOs of companies with a minimum of 500 employees. As observed in Figure 2.3 below, the category titles used by Fujitsu have changed slightly, yet strangely no reference was ever made to the original work, or findings, by E. Rogers. Indeed, it could simply be a coincidence that this new body of work arrived at identical findings to E. Rogers's original work. Alternatively, it could

be a classic example of adoption; albeit, given the timeframe that has elapsed Fujitsu would appear to be in the laggard category.



Source: Igniting innovation performance; Fujitsu Consulting Australia

Figure 2.3 **The Fujitsu Innovation Index 2006**

The innovation adoption categories developed by E. Rogers have the potential to play an important role in the measurement of innovation in the small business sector. The extensive research work he undertook covering the diffusion of innovation has provided relative certainty as to what characteristics influence adoption rate timeframes, and demonstrates how new ideas and information can be effectively integrated into the innovation process. However, the findings from the research literature indicate the need for more focused research into the adoption and reinvention processes associated with innovation processes undertaken by small business. It is particularly important to investigate how these processes might be measured in terms of contributing to, and building on, innovative capabilities. By accepting the broader definition of innovation as the introduction of something new or substantially improved, logically, adoption is one of the key foundations of the innovation process. Next, the paucity of data related to regional small business operators' education levels linked to innovation processes is discussed.

Linking education with innovation Another important theme to emerge from the innovation research literature is the link between education levels and innovation. However, there is a relative paucity of empirical research data investigating the links

between regional small business operators' education levels and the development of innovation capabilities (Thomson & Gray, 1999). There is some evidence available to suggest that acquiring new knowledge, thereby increasing intellectual capital, is a key element of the absorptive capacity process that drives sustainable business growth (C. Gray, 2006). Nonetheless, questions about the levels of education and training required to drive innovation remain, with concern focusing on a range of issues. These issues include: the implications for current management practices; the effective management of knowledge and intellectual capital; the measurement of intangibles; and whether the innovation process can be taught, discussed next.

A somewhat controversial issue which continues to engender debate is whether the innovation process can be taught. According to Cohen and Levinthal (1990), innovation can be taught using external knowledge, with the necessary information acquired through educational courses and skills development training, a procedure they refer to as investing in absorptive capacity. For example, formal training and skills development courses allow a business to enhance and grow their staff competencies and skill sets; the result is an improved knowledge base and an increased capacity to introduce innovation (Cohen & Levinthal, 1990; Edelman, Brush, & Manolova, 2002). Conversely, vocational learning of job skills through apprenticeships and traineeships, a process favoured by small businesses that focuses on the informal internal transfer of skills and knowledge, appears to be just as effective as more formalised tertiary education (Billett, 2001; Ehrich & Billett, 2004; Webster, Walker, & Brown, 2005). In brief, the value of training and skills development for staff is indisputable for building a business's operational and innovative capabilities. Nonetheless, a question remains concerning managers and sole operators' educational levels relative to developing their business's innovation capability (Thomson & Gray, 1999), discussed next.

The provision of ongoing staff training and development is an important decision facing small business operators. In today's dynamic business environment, staff training and skills development is considered an important investment in sustaining the business's future success, but do business owners consider their own educational needs? For example, internal knowledge combined with external knowledge acquisition, and effective dissemination of this knowledge throughout the organisation, are key components for maximising growth potential of small businesses (Edelman, et al.,

2002). Research studies indicate that knowledge levels increase as the business size increases (Cohen & Klepper, 1996; M. Rogers, 2004). Conversely, an Australian study found the proportion of educated employees actually decreases as firm size increases (Olsen, et al., 2006). Knowledge has become a valuable commodity intrinsically linked to the development of a small business's innovation capabilities. In brief, research indicates small businesses overall have relatively low participation rates in training (Macpherson, Jones, Zhang, & Wilson, 2003), particularly small micro-businesses and sole operators (C. Gray, 2006); whereas, increased participation in training and education could help improve knowledge and skills levels, discussed next.

The challenge for small business operators generally is how to effectively develop their knowledge levels through more education and training. The associated benefits of being able to improve and utilise the business's collective knowledge base and experience will invariably add value to the business. As a consequence of acquiring new knowledge, owners can set an example for encouraging the adoption, and nurturing, of an innovative culture among their employees. For example, both the research and grey literature resolutely confirm that learning, training and interpersonal skills development are integral components for the ongoing process of innovation growth and development strategy; nonetheless, it is a task needing to be driven by the owners and/or managers (Thomson & Gray, 1999). Indeed, owners and/or managers also need to heed this advice in order to continue building on their own skills base; thereby, increasing their effectiveness to manage and improve their business's innovative capabilities. In brief, ongoing training and skills building activities are extremely important influences for the development of innovation capabilities. Next, the national implications for continued training and skills development are discussed.

Of national importance Given the small business sector's importance to a nation's economic prosperity, ongoing education of owner/managers is vital for building innovative capabilities. The prospect of nationally teaching businesses how to be innovative was alluded to by Porter (1990) when he argued a business's capacity to innovate rapidly, both technologically and procedurally, needs to be done in the right direction. For example, Porter (1990) posits new innovation drivers by introducing ideas such as developing industry clusters to facilitate partnerships, while additionally establishing alliances for enabling the transfer of knowledge. These new drivers include

embracing the changes occurring in different industry and operating environments, in addition to diversifying and differentiating the products and services currently being offered. In brief, Porter is one of many researchers that strongly emphasises the importance of ongoing training and skills development for not just employees, but for owner/managers as well. Importantly, business owners need to be prepared to take calculated risks in order to capitalise on opportunities when they become available (Porter, 1990), a characteristic often associated with entrepreneurs, discussed next.

Drucker (1994) describes highly developed risk assessment skills as a distinguishing feature that enables entrepreneurs to identify potential opportunities. Previously discussed in Chapter 1, entrepreneurs are one of the driving forces behind a nation's innovative capacity (Michael & Pearce, 2009). Several key points Porter (1990) posits linking innovation and entrepreneurs include: stay ahead of your competitors; don't be scared to share knowledge and know-how through collaboration; and be prepared to change to meet new challenges and opportunities. Learning and training are crucial for obtaining and maintaining a competitive advantage through innovation; whereby, newly acquired knowledge needs to be applied to seek out, and capitalise on, new opportunities and emerging trends. In brief, given the importance of small business to the prosperity of national wealth and job creation, owner/managers should be aware of the accrued benefits from ongoing training and skills development for building and enhancing their business's innovative capabilities.

In summary, a range of factors are associated with the why, what and how learning and training contributes to the development and nurturing of a business's innovative capabilities. The main theme within the innovation research literature is that continuous learning and teaching and/or training about innovation are crucial if a business wants to improve its innovative capabilities (Edelman, et al., 2002; Thomson & Gray, 1999). For example, several of the different approaches include:

- Cohen and Levinthal (1989, 1990) recommend investing directly in improving absorptive capacity through learning and training;
- Cameron (1998) advocates the more indirect approach of technological spillover effects;

- Porter (1990) asserts that entire countries need to be involved in shaping and developing learning attitudes for improvements in nation building innovation capabilities.

Additionally, a range of potential tools are available for learning about innovation; for example, Massa and Testa (2004) propose utilising benchmarking as a learning tool. There is also the application of the Deming Cycle and Japanese Kaizen procedures (J. R. Evans & Lindsay, 1999; Lynskey, 2004), used for teaching continuous improvements techniques in a process that equates to incremental innovation. There is overwhelming evidence in the wider innovation research literature supporting learning and training as invaluable contributors for developing and enhancing innovative capabilities. However, there is no general agreement on one best way to learn or teach innovation: hence, this is identified as a major research gap requiring further research. Next, a sample of innovation frameworks and models are discussed.

2.5.2 Innovation frameworks and models

Just as there are a multitude of typologies related to innovation, so too are there a multitude of different frameworks and models that can be applied to these typologies. For example, in their book *Models for innovation diffusion*, Mahajan and Peterson (1985) examine three main categories of innovation diffusion models. These models include: fundamental diffusion models; flexible diffusion models; and extension and refinement diffusion models. Within the SLR sample there were 10 studies which developed, discussed or examined innovation processes related frameworks, and a further 10 studies with innovation processes related models. Furthermore, Drazin and Schoonhoven (1996) postulate that an integrated, multilevel, research model is required 'for additional theoretical integration to link organisational context with industry-level dynamics (p. 1066). The authors examine in detail several innovation models which include: a theoretical model of multilevel creativity constructs; the punctuated equilibrium model; a density-dependence model; and a multilevel diffusion model called the heterogeneous diffusion model. Next, a small sample of the models and frameworks are discussed.

Adoption rate fundamental The first of the models discussed is the fundamental diffusion model. The outline of the model is expressed as a differential equation, and is examined by Mahajan and Peterson (1985). Importantly, it should be noted the actual

equations for the models discussed are not given here, nor are the model's authors cited; it is the underlying proposition, or function, of the models which is discussed. The fundamental diffusion model proposes that the actual diffusion rate of an innovation at a specific point in time is a function of the difference between the innovation's adopter population total at a point in time, and the number of previous adopters at the same time point. The outcome of the model is that as the accreted total of prior adopters reaches the total number of potential adopters within the population, the rate of innovation diffusion starts to decrease. However, various elements can affect the adoption rate, discussed next.

The actual rate of the innovation diffusion, which in turn affects the adoption rate of the innovation, is determined by a variety of elements. These elements include: the characteristics of the diffusion process; the nature of the innovation itself; the mode of communication channels used; and the endemic attributes of the population where the innovation diffusion occurs. Indeed, the fundamental diffusion model is clearly demonstrative of what Schumpeter described as the creative destruction process. For example, when a new product (such as the BlackBerry®) enters the current smartphone business market, it is adopted by businesses until such time as it reaches critical mass by the adopter population, at which point the demand starts to drop off. This decreasing rate of diffusion actually increases as more of its competitor's models become available, aided by improvements in the smartphone technology such as Google's Android operating system. In brief, the fundamental diffusion model explains what drives innovation fads and fashions and the products and processes which appear, become popular en masse, and then disappear; thereby, a process that makes for a highly dynamic and competitive marketplace. Next, a multi-adoption diffusion model is discussed.

Modelling for multiples While the fundamental diffusion model explains the increase in innovation adopter numbers, it does not account for multiple purchases by a single adopter. This situation is represented by the development of multi-adoption diffusion models. According to Mahajan and Peterson (1985), a number of these models have been developed with the purpose of forecasting repeat purchase trends in consumer markets; whereby, they take into account word-of-mouth influences. For example, numerous product innovations are re-purchasable; hence, the sellers of these products

become intensely interested in predicting the numbers of actual adopters who are repeat purchasers. Therefore, the multi-adoption diffusion model forecasts adopters who become product or brand loyal. Indeed, one could even assume that multi-adoption diffusion models spurred the development of customer loyalty programs. Next, models influenced by internal and external factors are discussed.

Mahajan and Peterson also examined both an external-influence and an internal-influence innovation diffusion model. The first model generally depicts the influence of external change agents on the diffusion process, with results depicted as a modified exponential diffusion curve with a negative exponent. The second model is underpinned by the contagion process, where the diffusion process occurs through interpersonal contacts only. The results are depicted by an S-curve similar to the diffusion process time-series graphs illustrated in E. Rogers's (2003) innovation diffusion book. In brief, these models are useful for explaining the diffusion of innovation processes, particularly from the context of business and consumer perspectives. Nonetheless, numerous models from within the combined literature review were also examined, one of these being the heterogeneous diffusion model, discussed next.

Modelling combined effects One of the more interesting conceptual innovation diffusion models in the research literature is the heterogeneous diffusion model. Developed collaboratively by Strang, Tuma and Greve in 1995 (Drazin & Schoonhoven, 1996), it was constructed as a methodological tool for simultaneously modelling the combined effects of organisational and network influences on innovation process outcomes. Drazin and Schoonhoven (1996) extol the virtues of the model for tackling the multiplicity of factors which influence innovation, by asserting it has the 'ability to resolve the theoretical problem of integrating contextual and diffusion approaches to innovation' (p. 1076). The model is primarily based on event-history analysis which predicts a hazard rate from historical events; whereby, the hazard rate represents the likelihood of an innovation being adopted, while the event is the adoption of an innovation. Importantly, two sets of parameter estimates are provided by the model. The first parameter set models characteristic factors associated with the innovation adopter; while the second set models the effects of contagion, defined as the influences on current adopters by previous adopters of the innovation. Additionally, each parameter set contains factorial subsets, discussed next.

Furthermore, there are factorial subsets within each of the two parameter sets of the heterogeneous diffusion model. These factorial subsets include: propensity – all non-network influences; susceptibility – how easily non-adopting organisations are influenced by previous adopters; infectiousness – attributes of previous adopters that influence potential adopters; and lastly, proximity – the similarity between previous and potential adopters. The model appears quite powerful in the context of determining the adoption propensity of a business, although the authors believe it could be applied to the modelling of other forms of innovation processes including innovation generation. In brief, the heterogeneous diffusion model has strong practical application to the small business sector and its related innovation processes, as it takes into account the multi-layered complexities of what is essentially a heterogeneous community. Next, a brief overview of the models and frameworks from the SLR sample are discussed.

A brief summary The findings from the SLR sample yielded 10 frameworks and 10 models pertaining to the study, measurement and explanation of innovation processes in small businesses. As with the models discussed previously, explicit details and the levels of applicability for these frameworks and models will not be given as a brief summation is deemed more appropriate. Thus, some of the models developed and/or applied in the SLR sample of innovation research papers include:

- a model of the consequences of proactive personality – for evaluating entrepreneurial traits related to innovation (J. Kickul & L. K. Gundry, 2002);
- a theoretical model predicting the effects of entrepreneurial orientation on willingness to participate in technology development programmes – for measuring small business's propensity to participate in small business innovation research programmes (Kropp & Zolin, 2005);
- a model for conceptualising authentic entrepreneurial leadership – for assessing human capital characteristics associated with entrepreneurial leadership (O. Jones & Crompton, 2009);
- an empirical model to measure the relationship between R&D and patent registrations (X. B. Li & Mitchell, 2009);
- the European Quality model and the Centrim Innovation model – combined, they are used to examine the relationship between total quality and small business innovation (Rodney McAdam, Armstrong, & Kelly, 1998);

- a research model for business-to-business trading exchange and adoption in small businesses – developed by combining factors from the Hierarchy of Effect model and the Diffusion of Innovation theory used to investigate the influences of external factors on awareness about business-to-business trading exchange (Quaddus & Hofmeyer, 2007); and,
- innovation development process (IDP) models and business modelling techniques (BMTs) – tools to define, support and analyse business processes; notably, the entire study focused on IDP models, their various implementation phases, and the theoretical outcomes expected (Scozzi, Garavelli, & Crowston, 2005).

Next, brief overviews of some of the related frameworks which help to explain, measure and understand small business innovation include:

- a combined conceptual framework for knowledge translation and a knowledge of measurement framework – for the purpose of interpreting, understanding and measuring codified data and knowledge (Major & Cordey-Hayes, 2000);
- a conceptual framework of entrepreneurial orientation – for examination of relationships between the entrepreneurial orientation of the business and its willingness to participate in government research programmes (Lumpkin and Dess, 1996 as cited in Kropp & Zolin, 2005);
- a normative framework of new-to-market development processes – used to drive and guide learning for selecting appropriate processes in new development stages (Mosey, 2005);
- conceptual frameworks detailing a range of "context-IT-use-benefit" (CIUB) models which capture the patterns and associated benefits of information technology and information systems adopted for knowledge management (Pflughoeft, Ramamurthy, Soofi, Yasai-Ardekani, & Zahedi, 2003).

In summary, conceptual models and frameworks can assist with the identification and resolution of operational and procedural problems related to innovation processes. They facilitate and support the development and nurturing of organisational culture and human intellectual capital necessary for building innovative capabilities. Moreover, they are used to identify, segment and analyse markets and customer relationships important for the development of innovation strategies. These aspects are related in various ways to the associated drivers of innovation such as diffusion processes,

adoption, reinvention and knowledge management; factors that play a crucial role in innovation processes and outputs. Finally, models and frameworks are also used for driving the development of the measurement, and in turn the better management, of innovation processes and outputs generally. Next, a summary of the IABS 2003 findings are discussed.

2.6 INNOVATION IN AUSTRALIAN BUSINESS SURVEY 2003

This section summarises the overall findings from the ABS *Innovation in Australian Business Survey 2003*, and discusses some of the identified knowledge gaps this thesis attempts to address. Importantly, the *Patterns of innovation in Australian Businesses 2003,* which reported on the IABS 2003 results, states: 'It is now accepted that although innovation is a key driver of economic growth, it is a complex process that is difficult to measure because many of the aspects of innovation processes are somewhat intangible' (Trewin & Paterson, 2006, p. 1). These comments further substantiate the difficulties involved with innovation research; moreover, they alert researchers to the fact that potential gaps still exist in the currently available innovation knowledge. This is particularly the case in the context of the small micro-businesses sector, defined as having one to four employees, as this sector was excluded from the IABS 2003 data; albeit, the sector was included in the ABS 2006–07 Business Characteristics Survey. In addition to a synthesised summary of the IABS 2003 findings, this section also briefly discusses associated limitations and identified knowledge gaps within the survey which include: definition and question complexity in the questionnaire; not specifying who completes the questionnaire; and the lack of education data obtained. Next, a broad overview of the IABS 2003 findings is discussed.

Overview of the findings The IABS 2003 findings are presented below; however, these findings cover all business sizes and are not specific to the small business sector. The survey was undertaken using a mailed questionnaire with a random sample of 8,500 businesses stratified by industry, state/territory and employee numbers. From a total of approximately 6,200 participants, 4,520 businesses were included in the final sample, which, after segmentation, resulted in 2,168 small businesses and the timeframe covers the years from 2001 to 2003. A summary of the overall findings are as follows.

- Some form of innovation was undertaken by 35 per cent of businesses; consequently, 65 per cent of businesses were non-innovators.

- Introduction of new, or significantly improved, goods or services was undertaken by 17 per cent of businesses; 23 per cent undertook some form of process innovation; and organisational or managerial innovations were undertaken by 21 per cent of businesses.
- The highest level of innovation activity occurred in the utilities and communications services sector with around 50 per cent recording innovations; whereas, the lowest levels of innovation activity were recorded in the construction and accommodation, cafes and restaurants sector with 30 per cent and 27 per cent respectively.
- Goods and services innovation occurred in around 10 per cent of businesses in mining, construction, retail and accommodation, cafes and restaurants; whereas, in manufacturing, wholesale trade and communication services it was undertaken by more than 25 per cent of the businesses.
- The communication services sector had the highest level of introduced operational process innovation with 40 per cent, while the utilities sector had the highest level of introduced organisational innovation with 35 per cent.
- The degree of novelty for goods and services innovation introduced – how new it was to the business introducing it – was 56 per cent; new to the world goods and services accounted for only nine per cent of businesses; whereas, 17 per cent of businesses introduced the new to the industry goods and services.
- The degree of novelty for operational process innovation new to the business accounted for 75 per cent of businesses, while only three per cent introduced new to the world operational processes.
- The share of turnover generated from the introduction of new goods or services was only 10 per cent for over half of the businesses who innovated; whereas, only about 10 per cent of businesses generate more than half of their turnover from introduced innovations. It should be noted that the turnover attributed to new goods or services by industry sector had a relative standard error (RSE) of greater than 50 per cent, making the data unreliable (Trewin & Paterson, 2006).
- Finally, the aggregated total of businesses with less than 20 employees who undertook some form of innovation was 63 per cent, which was equivalent to innovating businesses with more than 250 employees.

Importantly, only 31 per cent of businesses who innovate report expenditure on R&D activities; whereas, non-R&D expenditure related to innovation processes accounts for

approximately two-thirds of the business's total innovation outlay for those who innovate. The authors of the report state that 'the estimates of expenditure on innovation should be treated with some caution. Standard accounting practices do not necessarily cover detailed information on innovation expenditure' (Trewin & Paterson, 2006, p. 7). The introduction of new innovative products or processes makes only a limited contribution to the profitability of businesses overall. In brief, Australian businesses are generally quite innovative, with innovation processes spread evenly across most types of innovation areas. Next, a brief summation of some of the identified limitations in the IABS 2003 questionnaire are discussed.

Questionnaire limitations The first limitation identified with the IABS 2003 survey was the seemingly complex language and definitions used in the questionnaire. A number of questions appeared difficult to interpret and understand; whereas, the Oslo Manual recommends: 'The questionnaire should be as simple and short as possible, logically structured, and have clear definitions and instructions' (OECD/Eurostat, 2005, p. 124). The second limitation of the IABS 2003 questionnaire was there was no stipulation made as to who should provide the required answers. For example, it could be inferred that a busy owner/manager or other major decision-maker in the business could potentially have passed the questionnaire on to a subordinate employee because of lack of time. As a consequence, the information obtained may be misleading, inaccurate or incomplete, thereby rendering that specific survey data potentially unusable. The third limitation of the IABS 2003 survey concerned the lack of education information requested. Indeed, given the number of innovation research studies which emphasise important links between education and training levels for the development of innovative capabilities, it appears somewhat incongruent for the ABS to leave out questions related to this important area. For example, it is well documented that professional skills training and personal development, or interpersonal skills and attributes, are areas deemed crucially important for the development of innovation know-how, which in turn facilitate the nurturing of an internal innovation culture (Cohen & Levinthal, 1990; Luke Pittaway & Cope, 2007). In brief, these limitations including the use of complex language, not stipulating who filled out the questionnaire were deemed to be potentially detrimental to the overall accuracy level of the information obtained, whereas, the lack of an education qualification question

overlooked the opportunity to ascertain potential causal relationships. Next, the exclusion of the micro-business sector from the ABS sample is discussed.

An important knowledge gap identified within the IABS 2003 survey was the exclusion of businesses with between one and four employees, termed micro-businesses, from the sample. The reason this is a major information gap is because it excludes a considerable segment of the small business sector; namely, the micro-business sector including sole operators. This is a very important part of the small business community, often referred to as the Home-Based Businesses (HBBs) sector. A HBB usually consists of a sole operator, or husband/wife partnership, and accounts for 67.5 per cent of the total Australian small business sector (Wang, et al., 2008). For example, Wang et al. (2008) reports there are in excess of one million Australians operating over 850,000 HBBs, which act as important economic drivers contributing to local community sustainability, particularly in rural and regional areas. The authors conclude: 'But little research has been done either in Australia or abroad on this sector which means that HBBs have remained a 'hidden engine' that is poorly understood and inadequately supported' (Wang, et al., 2008, p. 28). Indeed, of the 145 papers reviewed in the SLR sample, only two papers specifically mentioned the micro-business sector. In brief, micro-businesses account for more than two-thirds of the small business sector; therefore, excluding them from the IABS 2003 sample misses a potential source of innovative activity.

In summary, the IABS 2003 findings provided a valuable insight into the innovativeness of the Australian small business sector generally. However, both the approach used, and the relevance of the findings themselves, are deemed to have certain limitations. For example, the exclusion of the largest small-business sector, the micro-businesses or HBBs, seems to be somewhat illogical, as was the extremely limited data collected related to education levels. The limitations within the questionnaire, such as the use of complex language and definitions and not stipulating who should complete the questionnaire, seem to be at odds with the recommendations made in the Oslo Manual (OECD/Eurostat, 2005). As a consequence of these research limitations, certain knowledge gaps in small business innovation still exist. The identified knowledge gaps in the IABS 2003 findings presented an opportunity for this thesis to address some of the gaps through an exploratory study. Next, an example of the inadequacy of small business advice from a government agency is discussed.

2.6.1 Government agency advice inadequate

Not only is the micro-business sector under-researched, but the level of support and advice from government business agencies also appears inadequate. For instance, Mitev and Marsh (1998) report that many small business operators in the United Kingdom complain about the inadequate, or confusing, advice they receive from government-sponsored small business advisory services, particularly advice relating to information technology. This situation also appears to be the case in Australia. A sole operator interviewed for this thesis, for example, reported receiving advice from a government small business advisory agency that told her not to go into business. The operator informed them of already having built a regular customer base from selling her products at markets for the previous three years, and had been constantly encouraged by these customers to set up a permanent shop. Based on this customer feedback the woman established a retail outlet; whereby, her business continues to operate successfully five years after the original advice was given by the small business advisory agency. In brief, the lack of research into the micro-business sector may contribute to inadequate level of support services and advice given by small business advisory agencies; whereby, further research specific to this sector is desperately needed, particularly in terms of understanding how businesses in the sector actually innovate. Next, an assessment of the research problem theory attributed to small business research is discussed.

2.7 Clarification of the research problem

This final section examines several of the issues associated with trying to clarify the essence of the overall problem in small business innovation research. These issues include, but are not limited to: the transferability limitations of large organisational innovation models (S. Laforet, 2009); innovation models and measures being non-specific to the small business sector (Prajogo, et al., 2013); the heterogeneity of the small business sector; and the lack of theory building as opposed to theory testing focused on small businesses (Tan, et al., 2009). Additionally, several research studies focused on small business innovation expound the paucity of empirical research literature specific to this important economic sector (Bhattacharya & Bloch, 2004; Hausman, 2005). While this thesis argues this not to be the case, it does turn the focus onto an alternative problem: an overabundance of research information that is difficult to condense, compare and synthesise. For example, Drazin and Schoonhoven (1996)

contend there is ‘a plethora of books on innovation’ (p. 1065); while Rogers (2003) refers to exponential growth of innovation diffusion research since publication of his first edition in 1962. Further complicating the amount of research information available, Tan et al. (2009) assert that the broad-based approach to small business research needs to become more focused; thereby, leading to a narrowing down of the range of issues and problems addressed by innovation research. Next, the issue concerned with the transferability limitations of innovation models and measures is discussed.

An important concern with small business innovation research is the transferability of models and measures originally developed in the context of large businesses (Carayannis & Provance, 2008). For example, many small businesses are constrained by resource limitations in both human and financial capital; therefore, how appropriate is the application of R&D expenditure as a proxy measure of innovation processes when 67.5 per cent of small businesses have less than five employees (Wang, et al., 2008)? According to the ABS, anecdotal evidence indicates much of the R&D activity undertaken by Australian small businesses is concentrated in specific industry sectors such as the biotechnology and pharmaceutical industries. Furthermore, Trewin and Paterson (2006) contend:

> Although these indicators have value in terms of analysing innovation they also have limitations. R&D data is an input measure of expenditure, while patents are a measure of invention. Neither R&D nor patents may ever lead to innovation outcomes or to the introduction of new or improved products and processes into the market (p. 1).

Applying these proxy measures of innovation to micro-businesses would classify many of them to be non-innovative; however, the findings from this thesis demonstrate this is definitely not the case. While acknowledging there have been research advancements made in the measurement of innovation, there are limited metrics developed specifically for small businesses with less than 20 employees. Furthermore, the ABS report on the IABS 2003 findings advocates caution concerning financial data related to innovation R&D expenditure when they suggest ‘the estimates of expenditure on innovation should be treated with some caution’ (Trewin & Paterson, 2006). The authors infer that detailed information specific to innovation-related expenditure is not necessarily recorded in standard business accounting practices. In brief, R&D expenditure as a proxy measure of innovation appears non-transferable to the small business sector,

particularly micro-businesses, as their R&D activities are constrained by limited resources (Hadjimanolis, 2000). Next, the relevancy of patent counts as a small business innovation metric is discussed.

Patent measures uncertain The use of patent counts as a measure of small business innovation processes also appears to have limited transferability to the sector (Carayannis & Provance, 2008). There are several reasons why patent counts are an inappropriate innovation measure in the small business context. Firstly, there is the argument that patents are taken out specifically to reduce competitive pressures; whereby, the product or process patented may never be actually commercialised (M. Rogers, 1998). An important point against patent counts as an innovation measure is that a patent's primary intention is to 'retard or inhibit competitors' (Michael & Pearce, 2009, p. 295). Secondly, there is concern about the licensing of patents through 'patent troll' companies that buy patents with the intention of enforcing associated IPRs on potential infringers; or alternatively, the selling of patent licensing agreements without ever having conducted any of the initial R&D work (Greenhalgh & Rogers, 2007). Thirdly, there are the prohibitive costs associated with patent applications, particularly with international applications where patent lawyers and advisers need to be engaged (L. T. Wright & Nancarrow, 2001). As a consequence of these factors, many small businesses rely on secrecy, first-mover advantage, complex designs or the registration of trademarks to protect their IPRs (Trewin & Paterson, 2006). In brief, the reasons outlined above substantiate why use of patent counts as a measure for small business innovation is not accurately representative, or transferable, into the small business sector. Next, the complexities involving the heterogeneous nature of the small business sector are discussed.

Diversity creates complexity The heterogeneous nature of the small business sector also relates to the large business sector; albeit, with some quite specific differences. For example, a human resources model for performance evaluation procedures can be easily applied to large businesses across most industry sectors, but the same model could not easily be applied to a husband/wife partnership or sole operator business. The dynamic nature of the small business sector itself, coupled with cultural differences across countries, further exacerbates the diversity within the sector. This situation creates problems in terms of the generalisability and transferability of country-specific research

findings being applied to countries of a different culture. One of the most crucial points in terms of the heterogeneity of the sector is the personal characteristics of the main decision-makers, such as the owner/manager. For instance, an owner/manager with a cultural upbringing and background from an eastern country will have different characteristics and attitudes than someone born and raised in a western country. Subsequently, one of the recommendations from Tan et al. (2009) is that the old formulaic checkbox type research tools are no longer appropriate for undertaking small business research. The authors argue new research methods incorporating key operating factors and conditions need to be developed, tested and explored, which could then be based on a 'live-with-meaning best-practices database' (Tan, et al., 2009, p. 249). A pertinent proposition offered by Tan et al. (2009) to address the heterogeneity of the sector is: 'Our sense is that small business research needs to uncover an entirely different way of thinking' (p. 250). In brief, in acknowledging the innovation process is an extremely complex and contextually specific area of research, the heterogeneous nature of the small business sector requires an innovative research approach to address such complexity. Next, the issue of theory testing as opposed to theory building is discussed.

The overall findings from the combined literature review show that much of the small business research is focused on theory testing as opposed to theory building. Subsequently, Tan et al. (2009) contend there are two main types of qualitative research with the specific aim of building theory; firstly, the positivist qualitative research approach, and secondly, what the authors' refer to as the 'structurationist tradition' (p. 246). This second approach underpins a sociological perspective which aims to analyse important phenomena with the intent of constructing context-specific theories 'which have an acknowledged temporal and social situatedness' (p. 246) applied to them. Specifically, the authors claim they have seen little evidence of this type of theory building research published in the small business journals they reviewed. This lack of evidence in theory building is the consequence of, the authors argue, the fact that most management schools are still focused on providing only quantitative methodology training, discussed next.

More qualitative training required Another reason for the paucity of theory building research is the lack of guidance for research students on the kinds of theoretical

products generated from qualitative data. Hence, armed with extensive industry experience collecting qualitative data, this thesis set out to build a small business innovation theory congruent with qualitative data use. One such theory output from qualitative data, according to Tan et al. (2009), is termed process theory; whereby, various streams of analysed qualitative process data are brought together to form the basis of a theory for the prediction of potential outputs and outcomes. The authors further discuss a number of other theories generated from qualitative data which include: a propositional inventory theory; concept or construct development theory; and typology theory. However, the authors concede that typology theory is not really a theory, although they argue a good typology makes a valuable contribution towards the generation of theory; whereby, strong theoretical foundations are needed to help explain the myriad of complexities associated with small business innovation research. Indeed, a theory is defined as an organised set of propositions logically related that provide a means of predicting and/or explaining observable phenomena; therefore, building a theory on small business innovation is a key objective of this thesis. In brief, by combining practical industry research experience with academic research theory focused on qualitative data and associated analysis techniques, this thesis has made a substantive contribution to this theory building shortfall. Next, an overall summary of the literature review is presented.

2.8 SUMMARY OF THE RESEARCH LITERATURE GAPS

This chapter presents a wide ranging literature review process using two separate approaches. Firstly, it examined the extant innovation research literature through the lens of a traditional literature review. Secondly, an SLR process was applied to review journal publications covering 25 years of small business innovation research between the years 1985 and 2010. The findings from these two research literature review approaches were synthesised to form an overview of the small business innovation knowledge gaps; whereby, the six major gaps identified which are contextually specific to regional small business are:

1. ambiguity remains in determining a universal definition for innovation;
2. knowledge gaps about the interconnected relationships between innovation activities and processes remain;
3. difficulties in measuring innovation capabilities continue to exist;

4. research levels of innovation in Australian regional small businesses remains under-represented;
5. many innovation models and frameworks are developed for large businesses; and,
6. small business innovation research is problematic because of the inherentcomplexity associated with many of its intangible inputs and outputs.

Next, a brief summary of these findings are reiterated, starting with the difficulties in defining innovation.

1. Ambiguity in defining innovation A common perception within the research literature are that innovation research, particularly defining innovation, is fraught with difficulties. The difficulty involves a clear and concise definition of innovation, made more difficult because of the complexity about the range of activities which constitute the various forms of innovation. For example, according to White and Bruton (2007), 'Defining innovation is not as easy as it would seem. Most of us think we know what innovation is, but we have our own frames of how to define it' (p. 21). Indeed, Downs and Mohr's (1979) research on developing a theory of innovation assert that too many meanings have been ascribed to innovation which has led to ambiguity. The anecdotal evidence from the interviews undertaken for this thesis supports this notion; whereby, many different interpretations for defining innovation were proffered by respondents. The overarching view is that innovation is about the development or introduction of something new to the business, with the aim of adding or creating value for that business. However, innovation also involves reinvention and adoption, thereby encompassing such activities as adaptation, knowledge creation and integration, collaboration and R&D processes; the outcomes of which eventually lead to the diffusion of innovation and technological spillover effects. The context in which innovation occurs has a significant influence on how it is defined; hence, the definition may vary from user to user relative to their particular circumstances and operating environments. This leads to several innovation knowledge gaps within the innovation research literature, discussed next.

2. Associated knowledge gaps Even though considerable volumes of research have been conducted on innovation generally, there still remain several knowledge gaps in the extant literature. These knowledge gaps arise from the complex interconnectedness

of the relationships between innovation activities and processes which extend over five broad areas:

a) what actually enables (drives) innovation to occur;
b) can innovation processes and capabilities be taught;
c) is innovation and associated capabilities measurable;
d) do formal education levels exert an influence on innovation; and,
e) what are the true benefits of innovation?

One reason for these knowledge gaps, according to Brown and Frame (2007), are the levels of uncertainty and inconsistencies that prevail within the innovation research field:

> Research into innovation management and the related disciplines i.e. is fragmented, inconclusive, inconsistent and with relatively low-levels of explanations. The challenge for innovation managers is that no empirically based roadmap exists of how and why innovation emerges, develops, proceeds and terminates over time' (p. 4).

As with defining innovation from a generalised perspective, these five knowledge gaps are contextual in nature; that is, different forms of innovation occur within, and apply to, different circumstances and operating environments. While acknowledging there have been many research advancements made towards gaining a greater understanding about what enables innovation to occur in a business setting; a number of small business innovation knowledge gaps still exist due to its inherent research complexity. The contextual nature of small business innovation occurring under different circumstances (micro-business), and within different operating environments (sole-operator), has a deterministic influence on the complexity of innovation in terms of the how, why and wherefores compared to larger businesses; and which therefore continue to perpetuate these knowledge gaps. One particularly complex knowledge gap emphasised in the wider literature is focused on innovation measurement, discussed next.

3. Difficulties in measuring innovation capabilities An oft-quoted business adage 'You can't manage something you can't measure' is an underlying theme that haunts innovation research. The difficulty of trying to measure innovation activities and capabilities is due, in large part, to the inherently complex nature of innovation

generally. For example, many of the innovation inputs and outputs are intangibles such as knowledge generation, technological spillover effects, intrinsic skills development, organisational culture, personal background and attributes, and networking and collaboration activities. The two proxy measures currently used for measurement of innovation outcomes and outputs were developed for large organisations, with one actually being a measure of inputs; and therefore are inappropriate for application in the small business sector. These two measures, R&D expenditure and patent counts, according to Black (2001) 'are not clearly linked to innovation', because 'patents provide a better measure of invention than innovation' (p. 35). The anecdotal finding of this thesis indicates many businesses do not have the financial or human resources to undertake formal R&D programs, particularly within the retail sector. Further, Tidd et al. (1997) concur with this finding by asserting: 'Retailers may have relatively small R&D commitments in the formal sense' (p. 26). Thus, a business's level of innovation capability is difficult to measure because it consists of many intangible inputs and outputs. Next, an overview of current innovation levels in Australian businesses is discussed.

4. Innovation in Australian businesses According to the IABS 2003 findings by the ABS, one in three Australian businesses are deemed to be innovative. However, the innovation metrics used by the ABS, such as patent counts, have obvious limitations, particularly for the small business services sector. For example, a new service is unlikely to be patentedand according to Prajogo (2006)there is little distinction made between product and process innovation in the services sector, where the nature of services outputs are described as 'fuzzy'. Prajogo (2006) contends 'the emphasis of innovation in services will be placed on continuity rather than newness' whereby '...service is mostly adopted; hence, placing more emphasis on process rather than product (p. 220). The findings from this thesis indicates many businesses that have short adoption timeframes for products or processes are usually involved in a raft of additional innovation-related activities and processes, such as proactive customer engagement; strong marketing orientation; and environmental scanning for new ideas, trends and opportunities. Subsequently, new innovation metrics need further development to accommodate these activities to form a set of composite indicators specifically for the small business sector. Thus, because current innovation metrics are focused primarily on measuring associated inputs (R&D expenditure) and outputs

(Patent counts) and applied to all businesses small and large, there is a strong possibility that the ABS research findings under-represent the number of innovative small businesses in Australia. Next, an overview of innovation frameworks and models are discussed.

5. Innovation models and frameworks Just as innovation takes many forms, there are many innovation frameworks and models detailed in the innovation research literature. For example, some frameworks and models are used for measurement of innovation processes and outputs, others are predictors of successful outcomes or performance levels; whereas, the majority focus on the planning, building and management of innovation capabilities. The proliferation of innovation frameworks and models is due, in part, to the widely espoused notion that innovation is crucial for securing three business objectives: 1) to gain sustainable competitive advantage; 2) a trusted approach to defending a strategic position; and 3) to achieve business growth. Nevertheless, guaranteed success is by no means assured, for example, as Tidd et al. (1997) contend: 'The history of product and process innovations is littered with examples of apparently good ideas which failed in some cases with spectacular consequence' (p. 10). Similar to a well-constructed business plan, a well-constructed innovation model or planning framework can still potentially fail if it is not appropriately implemented. Thus, innovation models and frameworks can be useful in building innovation capabilities, or for predicting and measuring innovation processes and outputs. Nevertheless, the various innovation models and frameworks are only useful if they are applied and implemented appropriately; whereas, accurate measurement can only occur if the correct processes and outputs are being measured. Next, an overview of some of the innovation research problems is discussed.

6. Innovation research problems One consistent point within the innovation research literature is how complex the innovation process is, making its research problematic. This complexity encompasses a whole range of factors and research areas that also make it difficult to measure and/or categorise. Examples of such factors include: different innovation typologies; difficulties measuring intangible inputs and outputs; contributing influence of end-users; difficulties collecting innovation-related financial data; distinctions between reinvention and adaptation; knowledge creation and creative destruction; technological spillover effects and adoption rates; the influences of

networking and collaboration; and absorptive capacity and intellectual capital. Importantly, all these factors have varying levels of influence on innovation processes and outputs generally; thereby, adding to the overall research complexity.

Consider the difficulties associated with accurately measuring two such factors: knowledge levels and a single innovation process where no financial data exists. Firstly, Nonaka and Takeuchi (1995) describe two distinct forms of knowledge: explicit and tacit. Explicit knowledge is easy to formalise, is systematic, and easy to document making it easily communicated and shared. In contrast, tacit knowledge is based on personal experiential learning, is relatively hard to formalise and document; thereby, making it harder to communicate and share. Both forms of knowledge have considerable influence on innovation processes and outputs, yet only explicit knowledge is easily measured. Secondly, imagine a business that researches and develops a new operational process that involved no expenditure apart from man-hours, which were not recorded: how is this innovation measured? According to the Oslo Manual (OECD/Eurostat, 2005), there are substantial difficulties in collecting innovation-related financial data, mainly because many businesses fail to keep accurate financial records of innovation-related expenditure. The associated confluences of complex factors influencing innovation processes are substantial; therefore, such complexities tend to create a range of associated research problems. Indeed, one could assume these complexities are some of the key reasons which drive much of the innovation research. Thus, innovation is a difficult research topic, partly because as a process it is still poorly understood, and partly because many of its constituent components are difficult to measure. Next, a final summation of the literature review is discussed.

Closing summation Clearly, there are considerable volumes of research literature and textbooks focused on a wide range of innovation-related topics. In contrast, several research papers have suggested there is a paucity of empirical research literature on small business innovation available.While there may be limited availability of empirical researchspecifically in the area of Australian regional small business; the SLR findings from this thesis demonstrate this is not the case for small businesses generally. The wider innovation literature suggests innovation research encompasses a wide range of complex, and interdependent, processes and activities. As a result of this complexity,

there is some suggestion of paucity in empirical research that provides definitive theories and/or definitions of what innovation entails (Tan, et al., 2009). Clear definitions and theories about innovation could lead to better understanding of how it can be effectively managed and, perhaps more importantly, how it can be accurately measured. For example, E. Rogers (2003) argues the need for '...a standard classification scheme so that the perceived attributes of innovations can be described in universal terms' (p. 223). Indeed, the attainment of such universal classifications and standardised definitions, in addition to appropriate measures or indicators for innovation processes and outputs, would potentially make the research process more accurate. In practical terms, clear definitions and measures for innovation would make it easier for the business operator to understand what innovation processes involve; thereby, allowing them to apply this knowledge in a sustainable way to not only benefit their business, but the country's economic prosperity as well.

CHAPTER 3

The research design and methodology

Outline of Chapter 3	
Section	**Content**
3.1	***Introduction*** Highlights the purpose of the chapter and introduces the main methodological approach used in the thesis.
3.2	***Stage One: A systematic approach*** Describes the procedures involved in the research design, the theory development process, the selection and justification for paradigm selection, and provides definitions of important key words and themes used within the thesis.
3.3	***Mixing multiple methodologies*** Discusses the application of a multi-methods approach, and identifies the knowledge gaps in the IABS 2003 findings. Examines the limitations of using a multi-methods research design, justifies the benefits of using such an approach, and then explains the development process of the questionnaire.
3.4	***Stage Two: The implementation process*** Describes the questionnaire testing procedure, the primary data collection process, and the outcomes from the survey.
3.5	***Data analysis techniques*** Presents the steps involved in tabulating the primary data, the analysis techniques applied, the limitations inherent within the primary data, and an overview of the results obtained.
3.6	***Assumptions*** Discusses the assumptions required for applying a mixed methods approach, the primary data collection and analysis stages.
3.7	***Conclusion*** Presents a summary of the chapter contents.

3.1 INTRODUCTION

This chapter builds on the innovation research knowledge garnered from the literature review in the previous chapter to describe the methodological pathway followed for this thesis. Because of the complexity inherent in the innovation process, a systematic approach to the research design is employed with the aim of keeping the methodological pathway simple, yet appropriate to the needs of the research topic. For example, Hannon and Atherton (1997) invoke the concept of orienteering as a metaphor for business planning, where a written business plan is the equivalent map for navigating a business environment. The authors further suggest a map alone will not get the participant to where they want to go without basic skill sets such as; ability to use a compass, read a map and certain levels of awareness about the surrounding

environment. Other studies suggest that it is the actual physical and mental processes involved in producing the business plan that are of the greatest benefit, not the final written plan itself (Lyles, Baird, Orris, & Kuratko, 1993; Robinson & Pearce, 1984). In contrast, Hills (1985) questioned the actual significance of having a written business plan; whereas, Sahlman (1997) argued the more complex and elaborate the written business plan is, the more likely the business is to fail. This chapter sets out to demonstrate it is the actual planning and implementation processes which are the most beneficial aspects of a research design plan. The plan maps out the methodological pathways followed for the research design, with the completed thesis being the final destination point. In brief, the primary aim is to make the research design systematic, yet kept simple, with the chapter outline above demonstrative of this simplistic approach. Employing a systematic approach for the research design is discussed next.

3.2 STAGE ONE: A SYSTEMATIC APPROACH

One of the main innovation research priorities of the former Howard government focused on promoting and understanding what drives innovation culture. For example, an excerpt from the National Research Policy white paper notes the need for 'Understanding the factors that lead to highly creative and innovative ideas and concepts…that lead to their introduction, transfer and uptake' (Anon, 2006, p. 56). However, given the considerable volumes of research undertaken into innovation generally over previous decades, there still remain no clear empirical research findings about what drives innovation culture in small businesses. The wording used in the National Research Policy paper appears to signify the actual innovation process is no more clearly understood today than it was back in Schumpeter's day (Hoffman, et al., 1998). Because of this apparent lack of understanding about what drives innovation, coupled with the multitude of complex, interconnected, variables known to foster and facilitate innovation capabilities, it was determined that a simple, yet systematic, approach was needed to address the research topic. To paraphrase from the National Research Policy white paper, an 'understanding (of) the factors' was required to make sense of the innovation research previously undertaken; and, in particular, how it all fitted into the context of small business environments, discussed next.

Understanding small business innovation The first issue that emerged from the innovation research literature is how much innovation research is predominantly

focused on large organisations (Hausman, 2005). In particular, research areas focused on the planning, strategy development, strategic planning, management, and the measurement of innovation were all heavily skewed towards larger organisations. However, an ever increasing number of research papers focus on small-medium-enterprises (SMEs); albeit, a noticeable paucity exists for research conducted specifically on small business from an Australian perspective (Bhaskaran, 2006; Bhattacharya & Bloch, 2004). There are a range of measures for innovation which include: research and development (R&D) expenditure; number of patents or trademarks registered; and new products or services bought to the market (Franco-Santos & Bourne, 2005; Hipp & Grupp, 2005; Hyland & Beckett, 2005); yet these measures were developed predominantly in the context of large organisations. In contrast to the overabundance of innovation research focused on large organisations, an oft-quoted leader in entrepreneurship research, the late Mike Scott, once remarked 'a small business is not a little big business' (Pegler, 2008). In brief, the wider research literature and several SLRs undertaken, which concentrated on all facets underpinning innovation processes and their outcomes, indicate the entire innovation process still remains poorly understood (Becheikh, et al., 2006). To address this knowledge gap, this thesis focuses specifically on small business innovation by applying a systematic approach, discussed next.

Taking a systematic view The paucity of empirical research specific to understanding and measuring small business innovation begs the question: what needs to be done? Other questions still remain unanswered, such as can large business innovation measures transfer into the domain of the small business environment (Dean, Brown, & Bamford, 1998)? Additionally, do more sensitive measures need to be developed for small businesses (Becheikh, et al., 2006; Glenn & Weerawardena, 1996; Hausman, 2005)? If more sensitive innovation measures could be developed for small businesses, then what are the important influencing factors which require a more concentrated research focus? Thus, to develop a more comprehensive understanding of prior innovation research, two literature review processes were employed. Firstly, a traditional literature review was undertaken to support the development of a thesis research statement, and to provide the foundations for the research design and research background. Secondly, an SLR covering 25 years of innovation research was undertaken to provide an evidence-based overview of a generation of innovation

research. Traditional literature review methods have inherent limitations associated with them such as: potential lack of rigour; possibility of researcher bias (Franco-Santos & Bourne, 2005); subjective influence of results; and publication bias (Fink, 1998; Hart, 1998; Mulrow, 1994), discussed next.

There are several aspects which may raise concern when conducting a traditional business research literature review. It has been intimated that the traditional narrative literature review has certain limitations due to potential lack of rigour (Franco-Santos & Bourne, 2005); whereby, the process is conducted in an ad hoc way that is not easily replicated. This is in addition to possible researcher bias and/or personal subjectivity (Fink, 1998; Hart, 1998; Mulrow, 1994); for example, where researcher's cite their own work, or do not acknowledge other empirical work by competing researchers. Indeed, there is also suggestion of possible publication bias (Kitchenham, 2004), which refers to the problems arising when only successful research outcomes are selected for publication. For example, positive research results are more likely to be published than inconclusive, or negative, results. Hence, a number of business research literature review techniques have evolved including citation analysis (Neely, 2005) and the evidence-based SLR process (Tranfield, et al., 2003), originally associated with medical research literature reviews. In brief, the use of SLRs is deemed appropriate for business and management research; however, citation analysis is not without its problems, discussed next.

Literature review bias There has been criticism levelled at the use of citation analysis as a literature review technique. This criticism arises when citation analysis is used as the starting foundation for the development of a traditional review process (Lane, 2006). The primary criticism stems from the preponderance of researchers who cite their own works over and above work of other researchers. Researchers may also cite close friends and associates in preference to those from competing academic institutions or research agencies (Lane, 2006). The SLR process differs from traditional literature reviews and citation analysis through the use of a carefully developed review protocol, which is fully replicable and transparent; therefore, the process is formally documented and objective, making it an accepted form of scientific inquiry and activity (Tranfield, et al., 2003). Thus, adopting a SLR process for this thesis ensured an overall theory building approach was developed in a systematic and pragmatic way. The theory

building approach provided a solid understanding of potential problems that could be encountered researching a topic as complex as innovation (Leseure, 2000). In brief, implementation of the SLR process provided important grounding and guidance for the development of the research design framework. Next, the theoretical foundations involved with the research design are discussed.

3.2.1 Developing theory

Research design foundations The logical starting point for a systematic approach to the development of the research design is underpinned by the process of inductive research (McMurray, Pace, & Scott, 2004). Inductive research was chosen because of the dearth of universally accepted definitions arising from the review of empirical research focused on small business innovation. It also uncovered the lack of understanding of what factors constitute innovation (Becheikh, et al., 2006). For example, McMurray et al. (2004) postulate that: 'If the research question is one that calls for exploration and the development of knowledge, an inductive method of research is the only feasible way to go' (p. 72). Additionally, Babbie (2002) purports the inductive research model is used for the development of theories based on the analysis of research data; whereas, the deductive model is used for theory testing. Hence, using inductive research as the foundation, the methodological framework will draw on specific influences from an approach known as grounded theory (Glaser & Strauss, 1967); albeit, there are substantial differences and the reasons for these differences in the approach used is discussed next.

According to McMurray et al. (2004) and Collis and Hussey (Collis & Hussey, 2003), grounded theory is a process developed through inductive research, which begins at the level of observation. The process involves several sequential steps, and starts with the observation of a research problem or event that has occurred. This is where the first major difference occurs between the theory building approach and grounded theory; an extensive literature review had been undertaken prior to any observations taking place. The next step in grounded theory involves information pertaining to the problem being collected; whereby, the research concepts and variables related to possible explanation of the problem are created or identified. The collection of this information for the thesis was done through examination of the research literature, and not by observation within the subject population. The grounded theory then process proceeds to the conceptual

level, where these concepts and variables are used to develop a generalised relationship to describe the possible cause of the problem; for example, by putting forward a cause and effect theory. This is similar to what occurred with the findings following the analysis of the primary dataset. Both processes concluded in similar ways with further examination of information related to the problem in an effort to confirm or discredit the proposed cause and effect relationship, or theory, put forward. In brief, both of these research approaches are encompassed by inductive research which primarily focuses on the observation of everyday actions, identifying associated patterns of behaviour and effects, and using the observations for the development of building an explanatory theory as to the cause of the effects (McMurray, et al., 2004). As a result, it forms the foundations of a theory building research approach, discussed next

Taking a theory building approach Similar to the construct of grounded theory research, the theory building approach is a process that enters the data collection phase of a project without any formal hypotheses (Collis & Hussey, 2003). The process starts when the researcher describes and explains the what, why, and wherefores of events that have already occurred. The justification for taking such an approach for this thesis is underpinned by the fact that numerous theories and identified drivers of innovation are detailed in the extant research literature; thus it was decided to collect the data and see what processes, behaviours and attitudes emerged. Examples of these theories and drivers include: organisational culture and collaboration (Hyland & Beckett, 2005); ongoing staff training and development combined with knowledge management (Cohen & Levinthal, 1990); or the use of benchmarking to foster innovation (Massa & Testa, 2004). Nonetheless, there appears to be no general consensus, or at best limited empirical evidence, to support any one of these theories or drivers as being the most appropriate and applicable in the context of regional small business innovation. Because of these factors of uncertainty, this thesis needed to collect the primary data specific to regional small businesses to see how, or if, any of these theories and drivers applied before proposing any supportive theory, discussed next.

Therefore, it appeared essential that a supportive theory specific to regional small business innovation required the development of knowledge from the ground up. This entailed implementing a research approach similar to the construct of grounded theory which consists of three main steps: (1) the data collection process; (2) a coding process;

and (3) identifying the major themes (McMurray, et al., 2004). Firstly, the data collection process involved the use of interviews for identification of events, behaviours, ideas or phrasing statements connected to innovation processes that could be analysed. Secondly, the coding process involved processing the primary data collected into key categories; whereby, themes emerged in much the same way as they would during content analysis (Babbie, 2002). Thirdly, the primary data was collated, formatted, and analysed into an organised, usable, format to allow for the identification of major themes and theoretical propositions to emerge. As a consequence, these emerging themes formed a range of core constructs contextually relevant to small business innovation processes. These core constructs enabled the development of the propositional inventory; subsequently, they provided the supporting foundations for development of the conceptual innovation model and innovation planning framework. In brief, an inductive research approach was applied with this thesis for the purpose of building a theory about regional small business innovation. To guide the development of the methodological framework a paradigm is required, discussed next.

3.2.2 Paradigm selection

The basic definition for paradigm is 'a pattern or example, or prevailing assumptions in science' (Anon, 1987). Often referred to as a researcher's world view in the context of scientific research, a paradigm is defined as a set of beliefs and practices which guides a particular research area (Morgan, 2007). Therefore, while acknowledging the existence of numerous and varied accepted research paradigms, the research paradigm for this thesis was formed by integrating two separate postmodernist positivist paradigms (Hassard, 1993). These two paradigms are known as Pragmatic Pluralism (Watson, 1997), and Innovative Constructivism (Kaplan, 1998; Kasanen, Lukka, & Siitonen, 1993); the definitions of which are discussed later in this section. Because paradigms act as a guide for conducting scientific research, Babbie (2002) asserts paradigms are 'the fundamental models or frames of reference we use to organise our observations and reasoning' (p. 27). Babbie further contends: 'Ultimately, paradigms cannot be true or false: as ways of looking, they can only be more or less useful (p. 28). Therefore, in taking a mixed methods research approach, so too are the paradigms mixed, the reasons for which are discussed next.

A combination of world views Combining two research paradigms for the development of the research design framework allowed development of a simple yet systematic research approach. Research paradigms have evolved considerably since the work of Thomas Kuhn in the early 1960s and 70s, who described four basic research paradigms: Positivist, Poststructuralist, Interpretive and Radical. However, over time, many more research paradigms have been identified; hence, with so many paradigm approaches available, no single paradigm seemed most applicable for guiding this research. Collis and Hussey (2003) suggest there are two main business research paradigms: Positivist and Phenomenology, yet they resolutely acknowledge considerable blurring of these paradigms. The more paradigms that were evaluated, the more difficult the selection process became because no single paradigm approaches seemed sufficiently appropriate, the reasons of which are discussed next.

Selecting an appropriate research paradigm was difficult as no single approach provided adequate guidance for a simplistic and systematic research approach to small business innovation. Many paradigms appeared too complicated, such as work done by Burrell and Morgan (1979), who identified four types of paradigms: Functionalist, Interpretive, Radical Humanist and Radical Structuralist. Interestingly, some researchers argue that Burrell and Morgan took a very specific position when formulating their four paradigms for defining organisational sociology (Schultz & Hatch, 1996). For example, Schultz and Hatch assert each paradigm represents an incommensurable approach to new research that must be separately developed and applied for each specific research project. Alternatively, other researchers advocate the development of multiple paradigms and an integrationist approach to new research areas (Hassard, 1993; Morgan, 2007). Thus, Morgan (2007) contends there are obvious linkages between the ontological, epistemological and methodological issues within various approaches defined as a postmodernist positivist paradigm; a construct he terms a ‘metaphysical paradigm’ (p. 55). However, of the many different paradigms evaluated one of these approaches, pragmatic pluralism, showed qualities deemed appropriate for this thesis, discussed next.

A pragmatic view with a constructive approach Pragmatic pluralism, a paradigm first identified by Reed (1985), encapsulated the simplistic approach wanted for this

thesis. Fitting into the category of postmodernist paradigms, it is described as an approach that reflects the researcher's own personal views and experiences:

> An approach whereby the researcher draws elements from various disciplines or perspectives to produce what amounts to their personal paradigm – with its own ontological, epistemological and methodological integrity – to stand as a conceptual foundation of that piece of research. (Watson, 1997, p.4)

While appearing to break with the traditional use of a single paradigm approach, as suggested by Burrell and Morgan (1979), the application of a postmodernist paradigm over the older traditional approaches proved entirely appropriate for conducting this research. According to Willmott (1993), many researchers found they could not adequately accommodate their research within just one singular paradigm. Hence, Willmott (1993) and Morgan (2007) argue these old singular paradigms forced researchers into making either/or choices, the results of which were potentially artificial and misleading. As a result of this paradigm restriction, a paradigm crossing strategy was developed, discussed next.

Schultz and Hatch (1996) contributed to the development of a new paradigm crossing strategy, a process they titled interplay. The authors describe the process as the 'simultaneous recognition of both contrasts and connections between paradigms' (p. 530). Further support for employing a pragmatic approach came from Watson (1997) who contends 'the pluralist strategy has clear appeal for management research, given the multifaceted nature of managerial activity' (p. 5). The benefits afforded by a pragmatic approach are described in Table 3.1, constructed by Morgan (2007), who advocates a combined approach as opposed to the use of a single paradigm. Called 'abductive reasoning' (Morgan, 2007, p. 71), it is an approach that continually moves between inductive and deductive approaches; hence, it is an accommodative approach that encompasses such a complex research topic as small business innovation. This approach was further refined by combining it with another postmodernist paradigm, innovative constructivism, discussed next.

Table 3.1 **A pragmatic alternative to the key issues in social science research methodology**

	Qualitative	**Quantitative**	**Pragmatic**

	Approach	Approach	Approach
Connection of theory and data	Induction	Deduction	Abduction
Relationship to research process	Subjectivity	Objectivity	Intersubjectivity
Inference from data	Context	Generality	Transferability

Source: Morgan (2007, p. 71)

The research approach for this thesis was further developed when the pragmatic pluralism paradigm was combined with another postmodernist paradigm: innovative constructivism (Kaplan, 1998; Kasanen, et al., 1993). Because of the lack of empirical findings dedicated to small business innovation research, and the limitations of knowledge about how innovation occurs in small business environments, new research approaches were needed. For example, Morgan (2007) explains how Lincoln and Guba, during the 1980s and 90s, developed a process for evaluating the differences between positivism and competing paradigms; initially called naturalistic inquiry, this process eventually became known as constructivism. Drawing on this approach, a new paradigm known as innovative constructivism was formed described as:

> …the researcher starts with an observation of the limitations of the current knowledge and practices and goes on to develop innovative ideas to address these limitations either through documentation of innovative practices, or through logical deduction from the existing literature (Bititci, Mendibil, Martinez, & Albores, 2005, p. 334).

As a consequence of the suggested paucity of empirical research literature specific to small business innovation (Bhaskaran, 2006), a conscious effort was made to 'remove disciplinary boundaries and to mix methods to match to research questions' (Batterham, 2002, p. 1). However, implementation of a new combined paradigm approach is not without potential problems, discussed next.

The process of implementing a pragmatic approach by combining research paradigms and methodologies is not without potential problems. According to some researchers potential problems may include the replicability of the research, or the reliability of the results (Wallendorf & Brucks, 1993). To overcome such problems, Wallendorf and Brucks (1993) posit that: 'Researchers must ensure that their methods are carefully selected and carefully and conscientiously applied' (as cited in McMurray, et al., 2004, p. 335). Hence, emphasis is given to how the combined paradigms have guided development of the research design framework. In brief, combining two postmodernist positivist paradigms is deemed appropriate for an area of research as complex as small

business innovation; whereas, taking a singular research paradigm approach would have been inappropriate for a research topic with multiple contributing variables that include a range of hard-to-measure intangibles. Next, a range of definitions applied to the methodological research framework is discussed.

3.2.3 Definitions

Clear definitions are sorely lacking The wider innovation research literature has been dominated by two significant issues: lack of clear definitions and ambiguous research findings. Firstly, the innovation research literature lacks a universally accepted definition of innovation (Atherton & Hannon, 2000; Bhattacharya & Bloch, 2004; E. Rogers, 2003). For example, there is limited consensus as to what personal attributes, procedures and processes are the drivers associated with innovation outputs, particularly in the home-based business sector (Wang, et al., 2008). Secondly, there appears to be high levels of ambiguity surrounding prior research outcomes pertaining to innovation (Atherton & Hannon, 2000). For instance, a study focused on small business planning processes by Hannon and Atherton (1997) reports there is the tendency for researchers to 'insufficiently clarify the distinction between the process and its outputs' (p. 105). Additionally, numerous innovation models and theories are expounded in the research literature covering the management and performance of medium to large businesses; nevertheless, considerable uncertainty remains as to how, or if, these models and theories are transferrable into small business environments (Dean, et al., 1998; Hausman, 2005). Another oft-overlooked, under-researched, segment of the small business sector is the home-based business (HBB) which constitutes 67.5 per cent of the total small business population in Australia (Wang, et al., 2008). The following section aims to provide clear definitions of terms applicable to the methodological framework, discussed next.

This thesis strives to maintain a simplified research approach, a process which requires clear definitions of the terms and phrases being used within the research undertaken. Hence, definitions of the main terminologies used in the methodological framework are:

- Systematic – 'methodical, according to a plan, not casual or sporadic or unintentional, classificatory (1987, p. 1153)
- Systematic literature review – 'a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimise bias through exhaustive

literature searches of published and unpublished studies and by providing an audit trail of the reviewers decisions, procedures and conclusions' (Tranfield, et al., 2003, p. 209)

- Mixed (multi) methods research – 'a design for collecting, analysing, and mixing both quantitative and qualitative research in a single study or series of studies to understand a research problem' (Creswell & Shope, 2006, p. 5).
- Semi-structured interviews – 'the most effective means to gain a clear and sufficiently nuanced understanding of firm behaviour' (D. Thorpe, Ryan, & Charles, 2009, p. 189). The interview is administered using a questionnaire as 'an instrument specifically designed to elicit information that will be useful for analysis' (Babbie, 2002, p. 241). It is deemed to be semi-structured because it combines both open-ended and closed-ended questions. For example, an open-ended question is asked to qualify answers given from supplied show cards to an initial closed-ended question. This qualification process, or probe question, makes sure all possible answers to the initial question have been given by the respondent.
- Show cards – used for closed-ended questions and contain a list of exhaustive response categories shown to the respondent for each corresponding question asked (Babbie, 2002). Apart from the relevant response categories each show card contains, they may also contain Likert and attitudinal scales or codified demographic information specific to particular questions.

Furthermore, show cards are used extensively by national market research company Roy Morgan Research for collection of consumer opinion and trend (COT) data. They are used primarily to support responses to closed-ended questions because, according to Babbie (2002), 'they provide a greater uniformity of responses and are more easily processed than open-ended ones' (p. 242). Hence, show cards are used for two specific reasons. Firstly, they provide respondents with a range of exhaustive response categories relevant to the question asked; thereby, the show card use provides consistency and accuracy of the answers given by respondents. Secondly, they save time during the interview process by not forcing respondents themselves to consider the total range of potential answers available for the questions asked. In brief, the aforementioned definitions establish clearly defined meaning to procedures and processes employed within this research design framework; thereby, fulfilling a prerequisite for the SLR process which clearly states the need for 'a

replicable…transparent process' (Tranfield, et al., 2003, p. 209). The application of a multi-methods research approach is discussed next.

3.3 MIXING MULTIPLE METHODOLOGIES

This thesis applied a multi-methods research process to construct and implement the research design. The multi-methods research process is a 'new style of social research…in its early development' according to McMurray et al. (2004, pp. 260-261). As a research process, however, multi-methods research has been successfully employed within the market research industry for several decades. Indeed, the first prominent academic research example of its application was the Hawthorn study in 1939 (McMurray, et al., 2004). McMurray et al. (2004) argue academics have become too preoccupied with the virtues of traditional methods to enlist, or even examine, the strengths of new, or alternative, research methodologies. Multi-methods research is a research design which integrates qualitative and quantitative research methodology (Creswell & Shope, 2006). Viewed as being a complex research design, the benefit derived from using such a process is it 'not only overcomes the weaknesses of each of the individual approaches, but it also enhances theory building, hypothesis testing and generalising' (McMurray, et al., 2004, p. 262). An alternative to the traditional research methods, multi-methods research offers greater insight into the research problem according to McMurray et al. (2004) who assert: 'New researchers need preparation in multi-method inquiry...in which a variety of methods may contribute to the quality of research and maximise knowledge' (p. 302). Subsequently, there are clear benefits associated with using multi-methods research: one such benefit is to approximate data objectivity through the use of triangulation, discussed next.

Giving depth and richness to data The process of triangulation creates depth within a research design by adding rigour and richness to the collected research data. Defined as a process of using multiple research techniques within the same study, it is a way to validate and substantiate the data collected within that particular study (Babbie, 2002; McMurray, et al., 2004). Hence, the fundamental objective of employing the triangulation process is to ensure 'goodness of measures' (Sekaran, 1992, p. 175); basically, to confirm the reliability and impartial objectivity of the data collected. According to Sekaran (1992), for example, there are eight hallmarks of strong, usable, research: one hallmark being objectivity. Objectivity is defined as results based on facts

from the actual data analysed for the research, not from the subjective or emotional values of the researcher. Furthermore, McMurray, et al. (2004) suggest the triangulation process incorporates multiple research techniques to gather analysable data; whereby, each technique applied will yield complementary data while minimising researcher subjectivity. By implementing a triangulation process the data collected will attain improved levels of rigour, reliability and richness – another three of the eight hallmarks of good research (Sekaran, 1992). Finally, not only does triangulation add greater depth and quality to the data collected by overcoming any weaknesses inherent in using a single research method, but the process simultaneously enhances the precision of the overall research design. In brief, this research design involves application of a multi-methods approach by combining, and triangulating, various research methods to improve the quality of the research design; thereby, increasing the depth and richness of the data collected. Next, justification of why a multi-methods approach was implemented is discussed.

3.3.1 Justification of approach

This section justifies incorporating a mixture of qualitative and quantitative research methods, described as multi-methods research (Cooksey, 2007; Creswell & Shope, 2006; McMurray, et al., 2004). The primary difference between quantitative and qualitative research is distinguished by numerical and non-numerical data respectively (Babbie, 2002). Quantitative research takes an objectivist view and is concerned with the quantification of research observations to make them explicit through assigning numerical values, thereby, allowing for statistical analysis (Babbie, 2002). Alternatively, qualitative research takes a subjectivist view and is concerned more with ideographic explanations associated with mostly subjective observations. Qualitative research by its very nature can provide rich contextual data and raise questions that no quantitative research could do, because it allows for the emergence of unexpected themes (A. M. Ambert, 1994; A. M Ambert, Adler, Adler, & Detzner, 1995). Each single method has particular benefits suited to different purposes; although, Babbie (2002) believes a more comprehensive understanding of a topic can be obtained by using both techniques, discussed next.

Triangulation design model A mixture of qualitative and quantitative methods enables the researcher to further enhance the precision and confidence of the research findings

obtained. Multi-methods research is also described as a triangulation research process (Bryman, 2006; Jick, 1979; McMurray, et al., 2004), which when implemented is often referred to as a triangulation design model. Hence, the multi-methods research approach is employed in this thesis because 'in combination, provides a better understanding of a research problem or issue than either method alone' (Creswell & Shope, 2006, p. 5). Because of the many intangible variables involved in innovation research, Hausman (2005) asserts: 'To fully understand the forces affecting innovativeness in small business, quantitative research is often less valuable than qualitative research mainly because there is little guidance regarding what factors to measure' (p. 774). In brief, the application of a multi-methods approach enhances the ability for capturing both the tangible and intangible variables which contribute to innovation processes and outputs; thereby, helping to make the research findings easier to generalise, discussed next.

An important objective of this thesis is to make a practitioner-usable knowledge contribution to the small business innovation information currently available. Not only do the findings need to be widely generalisable, but they must hold particular relevance to the small business practitioner in Australia. When conducting business research requiring good generalisability, Collis and Hussey (2003) assert the importance of choosing the most appropriate research method available for the research project being undertaken. For example, examination of the innovation measurement framework in Figure 1.2 shows how multi-dimensional the innovation process is, and how it traverses a range of different functions and sectors. As a consequence of this multi-dimensional framework, it is difficult to find a 'one size fits all' approach to the research design and data collection techniques. Importantly, there are growing numbers of researchers within the innovation research field supporting the use of a multi-methods research design to investigate innovation processes (Tranfield, et al., 2003); this includes the use of a SLR (R. Thorpe, Holt, Macpherson, & Pittaway, 2005). Essentially, a research topic involving multi-dimensional and multi-faceted variables driving its processes and outputs requires a multi-methods research approach. In brief, the use of a multi-methods research design provides a solid platform for the establishment of rich, contextually specific, evidence-based research findings; thereby, leading to research outcomes that can be easily validated with high levels of credibility, discussed next.

Hallmarks of good research Because of the complexity associated with innovation research, the findings must have the hallmarks of good research; for instance, credibility and validity (Tranfield, et al., 2003). Achieving such outcomes enhances the usability of those research findings. Sekaran (1992) identified eight major hallmarks, or distinguishing characteristics, of good scientific research in what she described as 'goodness of measures' (p. 175). According to Sekaran (1992) these hallmarks include:

1. Purposiveness – starting with a definite aim or focus for the research;
2. Rigour – possessing a strong theoretical base combined with sound methodological design;
3. Testability – the ability to perform statistical tests on the data collected;
4. Replicability – similar results are obtained when the research is repeated under similar circumstances;
5. Precision and confidence – the degree of certainty in the results relative to the sample being studied as they exist in reality, and the probability that the estimations associated with the results are correct and accurate;
6. Objectivity – based on facts resulting from the actual data, and not on subjective or emotional values;
7. Generalisability – the scope or ability of the research findings to be applied to other settings or situations;
8. Parsimony – the simplicity of efficiently explaining the outcome of the research, or solution to the problem, using the least number of variables possible (pp. 10-14).

The application of these eight hallmarks of good scientific research provided the foundations of the research design development, and the subsequent implementation process, for this thesis. In brief, adhering to these hallmarks has resulted in outcomes and outputs with good validity and credibility and, in turn, good levels of usability for the small business practitioner. An explanation of why development of a framework to facilitate innovation planning is needed is discussed next.

One of the primary aims of this thesis is the development of an innovation planning framework specifically concentrated on small business's innovation processes. A framework acts as a structure into which contents, in this case the drivers of innovation processes, can be placed. For example, Milbergs (2004) contends that because

innovation is ‘inherently dynamic and constantly evolving...the framework will always be a work in progress. No framework can be definitive and final’ (p. 6). Further, Milbergs (2004) cites Mowry, who suggests frameworks act as a guide for data collection and analysis processes contributing to business innovation, particularly those aspects involving the main drivers and attributes related to innovation output performance levels. In another instance, E. Rogers (2003) purports that his latest book is ‘a revision of the theoretical framework’ (p. xviii) from his original work undertaken five decades ago; thereby, supporting the notion that a framework continues to evolve over time. Hence, given this research is exploratory in nature, output of a small business innovation planning framework is appropriate because it allows for future development to take place; thereby, meeting the changing conditions of a highly dynamic small business environment.

In conclusion, this thesis used a research design framework that incorporated Sekaran’s (1992) eight hallmarks of good scientific research. Using these hallmarks to guide the research design, this thesis:

1. implemented a mixed or multi-methods approach to achieve hallmarks 2–7;
2. analysed primary and secondary data to achieve hallmarks 3–6;
3. used a traditional literature review and an SLR process to achieve hallmarks 2–6; and,
4. the findings and outputs achieved hallmarks 5–8.

The findings from this thesis have good levels of validity and credibility; in turn, the findings have good levels of usability and generalisability for the small business practitioner. Furthermore, the development of an innovation planning framework specific to small businesses is a tool not only to assist small business practitioners further develop their innovative capabilities, but also a framework that allows for ongoing development to take place as further empirical evidence of innovation drivers becomes available. The next section discusses some of the research knowledge gaps identified within the IABS 2003 findings and questionnaire used by the ABS for their national innovation survey.

3.3.2 IABS 2003 data gaps

This section briefly reintroduces the research knowledge gaps identified in secondary data analysed for this thesis, from the IABS 2003 findings, first discussed in chapter 2. The various published reports by the ABS clearly acknowledge the difficulties involved with innovation research, such as defining what constitutes innovation, when they state 'innovations have no real impact until they are diffused - until they are taken into widespread use' (Trewin & Paterson, 2006, p. 21). This and other comments about the difficulties associated with measuring innovation demonstrate there remain many uncertainties surrounding the definition and measurement of innovation. The authors continue by positing that 'studies using R&D and patent data have limitations' (2006, p. 3) as ways to measure innovation, and thereby supports the notion that gaps still exist in the innovation knowledge currently available; particularly in the context of how innovation can be measured in small businesses, discussed next.

Small but important The first knowledge gap identified in the IABS 2003 data was the exclusion of micro businesses from the data sample. Micro businesses, defined as having 1–4 employees (M. Clark, et al., 2011) were excluded from the IABS 2003 sample as the survey was designed to cover only businesses with five or more employees (Trewin & Paterson, 2006). The reason this is considered a significant knowledge gap is because it excludes a considerably large segment of the small business sector; namely, the Home-Based Business (HBB) sector. These important businesses mostly consist of sole operators, or husband/wife partnerships, and account for 67.5 per cent of the entire Australian small business sector (Wang, et al., 2008). Wang et al. report that more than one million Australians operate over 850,000 HBBs that are important drivers of local economies. Such businesses contribute to local community sustainability and provide employment opportunities, particularly in rural and regional areas. Furthermore, the authors argue: 'But little research has been done either in Australia or abroad on this sector which means that HBBs have remained a "hidden engine" that is poorly understood and inadequately supported' (Wang, et al., 2008, p. 28). To address this knowledge gap, this thesis focused solely on small businesses defined as having 20 or less employees (M. Clark, et al., 2011). Further to this obvious knowledge gap in the IABS 2003 data, other significant identified knowledge gaps include education levels, technological spillover effects and networking activities. These are discussed in the next paragraphs.

Education and skills training The second knowledge gap identified within the IABS 2003 data is whether a relationship exists between formal education levels and innovation processes and outputs. For example, higher education levels, professional skills training, personal development and/or interpersonal attributes are all aspects deemed crucially important for the development of innovation know-how, particularly in the area of nurturing of an internal innovation culture (Cohen & Levinthal, 1990; Luke Pittaway & Cope, 2007). The IABS 2003 questionnaire contained eight parts specifically directed towards collecting innovation-related information; yet, Part 8 – *Staff skills and recruitment* only contained two questions concerning what skills the business looks for when recruiting, and where it finds new staff. There were no questions about education or skills and training levels of current staff. However, question 17 of Part 6 – *Business sources and methods* concerning the acquisition of knowledge and abilities did ask if graduates or academics had been employed; again, nothing was asked about current employee education levels.

Furthermore, an important theme in the innovation research literature is the relevance of ongoing education and skills training for building innovation capabilities in risk-averse businesses. For example, not to encourage ongoing education and training is to risk maintaining a culture that engenders an unwillingness for employees to experiment and make mistakes with new ideas, processes and products, which is vital to the development of an innovation culture (Hyland & Beckett, 2005; McGrath & MacMillan, 2000). Even though there is no one 'best practice' to pursue an innovation strategy, there does appear to be strong causal links between education and skills training levels and the development of a more innovative culture (Cohen & Levinthal, 1990; Luke Pittaway & Cope, 2007). Thus, the issues of education and skills training levels have not been adequately addressed in the IABS 2003 data. This thesis aims to explore whether education and skills training levels do play a role in fostering small business innovation capabilities; whereby, staff education and skill levels within a business could also influence how technological spillovers are treated, discussed next.

Technological spillover adoption The third knowledge gap identified from the IABS 2003 data concerns the effects of technological spillovers on small business innovation capabilities. Technological spillovers concerns business's take-up, or adoption rates, of new technological advancements pioneered by other innovative businesses (Cameron,

1998). For example, E. Rogers' (2003) theory on innovation diffusion suggests those involved in the technological spillover effect can be categorised into five groups. These five categories are: the true innovators, where the invention or idea originates; the early adopters; the early majority; the late majority; and finally, the laggards. The one thing that can be said about innovation associated with technological spillovers is the uncertainty as to what form the resulting innovation may take, how it can be initiated, or what the main influences are which contribute and encourage its adoption within any particular business or industry sector. Notably, E. Rogers (2003) found a time lag occurs from when an initial innovation emerges in the marketplace, to when it is eventually adopted by other businesses and/or industry sectors. The IABS 2003 data does not address any aspect of the technological spillover effect, nor collect any specific information concerning how quickly the adoption of new technologies or processes related to innovation occurs. Therefore, this thesis aims to explore this issue, which could also be influenced by networking activities, discussed next.

Networking towards innovation The fourth knowledge gap identified from the IABS 2003 data concerns the relationship between networking activities and innovation levels. For example, findings from an SLR report on research investigating business networking and innovation productivity concluded causal links exist between the two activities (L. Pittaway, et al., 2004). The study purports evidence exists to not only support the notion that networking between businesses stimulates innovation activities, but that network relations with suppliers, customers and various intermediaries including trade associations and service professionals also influence, and help build, innovative capabilities (Macpherson, et al., 2003; L. Pittaway, et al., 2004). Further, Macpherson et al. (2003) posit that networks 'help owner-managers strengthen their business by providing access to scarce resources, including skills, information and knowledge' (p. 259). Thus, networking activities afford a range of potential benefits to participating businesses over and above simply acquiring new ideas or knowledge. For instance, there is possible access to additional skill sets and other resources such as access to specialised machinery, raw materials and maybe even sharing of a customer base if the networking businesses offer complementary products or services. Interestingly, such levels of cooperation can also occur with direct competitors in a relationship known as co-opetition (Dent, 2011; Gnyawali & Park, 2009), which is more akin to collaboration than simple sharing of resources through a networking

relationship. Even though networking is not covered by the IABS 2003 data, it is an area beyond the exploratory scope of this thesis.

In summary, there are several important knowledge gaps identified in the IABS 2003 data. These knowledge gaps include: the exclusion of micro businesses from the data sample; the relevance of education and skills training levels; the importance of networking activities; and technological spillover effects – all of which have implications towards building innovation capabilities. Thus, this thesis aims to explore several of these particular aspects because of the potential they have to provide a better understanding of how small businesses not only foster an internal innovative culture, but how they may contribute towards building a business's innovative capabilities. Notwithstanding these identified knowledge gaps in the IABS 2003 data, there were also certain limitations within the questionnaire used to collect the data that are discussed next.

3.3.3 Limitations

Following identification of the knowledge gaps in the 2003 IABS data, this section addresses certain limitations concerning the IABS 2003 questionnaire. These limitations include: low response rates using a mail-out questionnaire; not stipulating who should fill out the questionnaire; the complexity of the language used; and the requirement to report specific financial data. The final limitation addressed concerns the relatively small sample size of the primary data analysed. The purpose of this section is to examine why these issues were considered limitations, and then to propose solutions for how to address these limitations.

Low response rate using mail-outs The first limitation identified is the use of a mail-out questionnaire for the IABS 2003 data collection. It is well known that mail-out response rates are often quite low (Howgrave-Graham & van Berkel, 2007; Quaddus & Hofmeyer, 2007); additionally, the mail-out questionnaire is often returned incomplete, potentially rendering sections of the data unusable (OECD/Eurostat, 2005; Starbuck, 1985). However, it is understandable from an economic perspective that to conduct a national survey utilising other data collection methods would involve considerable expense. There is also the added concern of self-reporting bias associated with mail-out questionnaires (Chase & Godbey, 1983; C. Perry & Wildman, 1989). This situation occurs when the respondent completing the questionnaire embellishes the answers to

make the business appear more successful, or more involved in particular activities, than what it actually is; thereby, potentially diminishing the quality of the results obtained (OECD/Eurostat, 2005). Thus, using the Oslo Manual (OECD/Eurostat, 2005) guidelines as the main frame of reference for the collection of innovation data, it was deemed appropriate to use semi-structured, face-to-face interviews with a pre-tested questionnaire to collect the primary data for this thesis. Next, a lack of directive about who should complete the questionnaire is discussed.

Decision-makers required The second limitation identified in the IABS 2003 questionnaire was the lack of a directive stipulating who should complete the questionnaire. For example, a busy manager or owner could potentially have delegated the questionnaire to a junior employee because of prior commitments; hence, the data obtained may not have been completely accurate or reliable. The resulting information obtained may be misleading or incomplete, thereby rendering that particular data potentially unusable (OECD/Eurostat, 2005). To address this limitation, a series of screening questions were asked of each business approached to ensure the respondent was a major decision-maker within the business (Frazier, 1983). The purpose of this procedure was to ensure the data collected had enhanced levels of purposiveness and reliability; thereby, enabling the data from each interview to have acceptable precision and confidence levels (Sekaran, 1992). The use of complex language in the IABS 2003 questionnaire is discussed next.

Language complexity The third limitation identified in the 2003 IABS questionnaire was the use of seemingly complex language and definitions. Subsequently, a number of the questions appeared quite difficult to comprehend and interpret, particularly from a layman's perspective. For example, Question 29 asked for an estimate of the business's expenditure in the financial period for activities related to the introduction of new or significantly improved goods or services. However, the question excluded expenditure on new operational or new organisational/managerial processes, expenditure on research and experimental development, and any routine upgrades of equipment. Admittedly, even with an extensive academic background in business and business research, I found this question quite difficult to understand. Indeed, the Oslo Manual (OECD/Eurostat, 2005) clearly states that the language used for any questionnaire should be simple, clear and easy to understand. Using semi-structured, face-to-face

interviews to address this limitation, if a respondent expressed concern regarding an unclear definition or complex question's structure, these concerns could immediately be clarified by the interviewer. Additionally, the use of interviews allowed the respondent to be totally clear about the questions being asked, while also allowing the interviewer to probe deeper to qualify a respondent's answer. Thus, interviews bring to the surface any underlying themes or issues, whilst providing a complete and contextually rich answer to each question (Silverman, 1973). The limitation associated with financial data collection is discussed next.

Financial data relevancy The final limitation identified with the IABS 2003 questionnaire is the relevance of financial data collected for determining how innovative a business is. Generally small businesses are reluctant to provide, or incapable of providing, comprehensively detailed financial data according to Dess and Robinson (1984). The authors reported difficulties associated with the collection of financial data while researching the small business sector such as owners placing restrictions on access to financial data, and varying accounting procedures within different businesses leading to increased error risks. Further, the Oslo Manual (OECD/Eurostat, 2005) reaffirms these financial data collection difficulties associated with innovation activities, suggesting there is added respondent burden and variations in the financial data quality. It suggests financial data should be sought only for the previous year of operation, which still requires extra time for the respondent to access and compile such information. Because of the wide-ranging scope of activities contributing to innovation processes and outputs, with a mix of tangible and intangible inputs, many small businesses would not keep financial records which accurately differentiate between innovative and non-innovative expenditure. Hence, the collection of financial data, particularly R&D expenditure not related to innovation activities, may not accurately reflect the true level of innovativeness a business displays. As a result of the difficulties associated with, and attributed to, the collection of financial data, a decision was made to limit the amount of financial information collected for this thesis.

The final limitation concerns the relatively small sample size of the primary data which contained semi-structured interviews conducted with 100 small business operators. While such a sample size may be considered small for research of empirical significance, it is deemed appropriate for this type of exploratory research. Thus, to

estimate an acceptable sample size level suitable for exploration purposes, the actual number was determined mathematically using the 'sample size determination for proportion formula' (Berenson, et al., p. 19). By inputting values for the desired confidence level, an acceptable sampling error rate and assuming a population proportion participation rate of 50 per cent, an acceptable sample size of 96 respondents was determined - which was rounded to 100. The actual values used are given in more detail in chapter 4. Indeed, while the sample size may be considered small, the use of semi-structured interviews as the data collection method still made the research process a large exercise logistically. The face-to-face data collection method was chosen based on prior experience for being able to obtain answers full of valuable insights and explanations from the respondents that provide 'rich and comprehensive data' (N. Evans & Sawyer, 2009, p. 359).

In brief, direct action was taken to address several of the limitations identified within the IABS 2003 questionnaire. Thus, the following actions were implemented:

1. use of semi-structured, face-to-face interviews to address poor return rates associated with mail-out questionnaires, while enhancing the richness and depth of answers;
2. use of clear and simple language to address problems associated with complex terminology and definitions;
3. use of pre-interview screening questions to confirm the position of authority of respondent, thereby ensuring appropriateness of respondent to provide informed and relevant answers;
4. use of a single financial data question about estimated turnover to reduce interview time, and the complexity of obtaining such information, and,
5. use of a relatively small sample size given the exploratory nature of the thesis.

Indeed, using the Oslo Manual (OECD/Eurostat, 2005) guidelines as the main reference point, it is felt that the actions taken have adequately addressed various data limitations. Thus, use of semi-structured, face-to-face interviews yielded contextually rich primary data which addressed the identified knowledge gaps in the IABS 2003 data; thereby, adding significantly to the insights and understanding about the levels of innovativeness within the small business sector. Next, the development of the thesis survey instrument (a questionnaire) is discussed.

3.3.4 Questionnaire development

This section discusses the process involved in developing the questionnaire used to collect the primary data for this thesis. The questionnaire was administered as a semi-structured, face-to-face interview, to overcome the disadvantages of mail-out questionnaires, such as low response rates and potential for self-reporting bias. Moreover, interviews facilitate the collection of richer, more in-depth data. The development of the questionnaire involved two stages, discussed next.

Stage 1: Developing a draft questionnaire and show cards The questionnaire used for the primary data collection was developed in two stages. The first stage involved development of an initial draft questionnaire which focused on obtaining data appropriate for addressing the four research questions. This was achieved using the synthesised findings drawn from the combined literature reviews, and by targeting the identified knowledge gaps in the IABS 2003 questionnaire. The draft questionnaire design and layout, and the crafting of the actual content, was developed using the guidelines from the Oslo Manual (OECD/Eurostat, 2005). The questionnaire was augmented with show cards that listed pre-coded, exhaustive responses to the questions being asked. Additionally, the show cards provided a range of Likert and attitudinal scales for measuring respondents' perceptions, values, and attitudes towards specific topics such as satisfaction level ratings from certain innovation procedures, or levels of importance attached to particular innovation processes. This completed the first stage of the draft questionnaire development; the second stage involved pre-testing and refinement procedures, discussed next.

Stage 2: Pre-testing of questionnaire The second stage of development involved pre-testing the draft questionnaire with several small business operators. This pre-testing process is crucial for identifying complex wording or delivery problems, using feedback from the respondents. Further refinements and adjustments were made following the pre-testing process to rectify any delivery or comprehension problems encountered. Thus, using the same questionnaire delivery methods to be applied for the primary data collection – semi-structured, face-to-face interviews – a select sample of six small business operators was interviewed for the questionnaire pre-testing. The purpose of pre-testing is to use the respondents' feedback, combined with the literature review findings, to create a questionnaire easy to understand from a small business operator's

perspective (OECD/Eurostat, 2005). For example, the Oslo Manual (OECD/Eurostat, 2005) guidelines state it is extremely important to make sure all interview respondents could quickly and easily understand the questions being asked of them without requiring long explanation. Furthermore, the Oslo Manual emphasises use of common language as opposed to technical terminology, keeping the format simple and logical, and maintaining relatively short delivery (interview) times. In brief, by adhering to the Oslo Manual recommendations, and following initial pre-testing, the completion of the second stage involved further refinement of the questionnaire, including final adjustment of the supporting show cards, discussed next.

Show cards assist with timeliness The design layout of the show cards should be clear, easy to read and simple to understand. Previously defined in section 3.1.3, the show cards purpose is to facilitate support for the quick and uniform delivery of the questionnaire, resulting in consistency and uniformity of respondents' answers. For example, the Oslo Manual (2005) contends the more time a questionnaire takes to administer, the lower the unit and item response rates will be; whereas, 'this effect can be minimised by devoting special attention to design and layout and by giving clear and sufficient explanatory notes and examples' (p. 124). The benefits of show card use were evident during my 16 years as a field interviewer working with Roy Morgan Research. In brief, the overall focus when developing the questionnaire, as with the show cards, is twofold: it must be easy to understand and administer, while still accurately collecting pertinent information that addresses the research questions.

In summary, the questionnaire was developed in two stages, using the Oslo Manual (2005) guidelines to assist with the design and layout. The focus of the questionnaire was to gather enough accurate data capable of answering the thesis research questions. The first stage involved developing an initial draft questionnaire accompanied by a set of show cards. The second stage involved pre-testing the questionnaire and show cards with a select sample of small business operators. The pre-testing process helped identify delivery and comprehension problems within the initial drafts, which were refined and adjusted. The questionnaire is likened to a precision instrument that cuts through the surface of vague definitions, and limited understanding, to deliver strong and clear, easily analysed data. The inclusion of show cards facilitated easy, time-efficient delivery and provided enhanced consistency of answers.

3.4 STAGE TWO: THE IMPLEMENTATION PROCESS

As with any other research or business project, the research design needs to be effectively coordinated and systematically implemented to obtain successful results. The implementation process focused primarily on the data collection guidelines outlined in the Oslo Manual (2005). This section explains how the Oslo Manual (2005) guidelines influenced not just the questionnaire development, but the entire implementation process which includes: how the population sample was selected; justification for using such methods; the implementation procedures; and explanation for inclusion of case studies. Firstly, a reiteration of specific innovation research problems covered in the Oslo Manual is discussed next.

Addressing innovation research problems The research design framework used by this thesis, and the implementation procedures employed, followed the main guidelines prescribed in the Oslo Manual (2005). A range of innovation research problems are identified in the Oslo Manual. These problems, and the corresponding methodology implemented to address them, are summarised in the following points.

- Problems associated with mail-out surveys include low response rates, and potential for poor quality data due to incompleteness or self-assessment bias. This issue was addressed by collecting data using semi-structured, face-to-face interviews; whereby, the interviewer can provide clarification and guidance on definitions or activities mentioned within the questionnaire. As a result, the overall quality of data collected was contextually rich and meaningful; whereby, question non-response rates were significantly lowered.
- A long and complicated questionnaire, using complex wording or technical jargon, can lead to high incompletion rates and poor quality data. This issue was overcome by utilising a questionnaire that contained simple wording and kept delivery time to a minimum, with an average of 25 to 30 minutes to complete. It was logically structured, had clear definitions, and used simple instructions with bold, easy-to-read headings on the show cards.
- Interview respondents who have not been involved in any particular innovation-related activities will create data gaps through non-response to those questions; thereby, making data analysis and comparisons more difficult. The issue of non-response rates was minimised by devoting special attention to the questionnaire

design and layout; specifically, giving clear explanations and examples for each question where required. Importantly, the questionnaire was designed so that respondents with little or no involvement in innovation activities could still reply to the majority of questions by reframing the question as a 'what if' scenario.

- Questions where answers use qualitative indicators may use a binary scale; whereby a simple yes/no binary scale has the advantage of being simple and reliable. However, the information such answers provide contribute little to the factors being investigated; in addition, varying degrees of subjectivity are introduced if answers cannot be based on substantiated facts if the question is misinterpreted. This issue was addressed by limiting the use of binary scale type questions where possible and replacing them with questions using ordinal scales. The advantage of using an ordinal scale is that it provides greater depth and meaningfulness to the answer because it promotes rankings of particular factors relative to their levels of importance or satisfaction. Nonetheless, this too may introduce varying degrees of subjectivity; although, such problems can be minimised during the analysis process (OECD/Eurostat, 2005).
- Even though the R&D and innovation processes are inherently related, some countries use separate surveys because 'the frame population for innovation surveys may cover industrial classifications (and small units) that are not included in R&D surveys' (OECD/Eurostat, 2005, p. 125). Additionally, businesses unfamiliar with the concepts of R&D and innovation may not understand the differences between the two processes, particularly if both concepts are in the same survey. The Oslo Manual (2005) suggests including both concepts in the one questionnaire offers greater scope for analysing the relationship between innovation and R&D at the business level. Following these recommendations, both concepts were included in the one questionnaire. If the respondent expressed uncertainty about the conceptual differences between the two processes they were able to be clarified.

Therefore, the Oslo Manual (2005) provided comprehensive guidelines for the development of the research design framework, in addition to recommending how the research procedures should be implemented to overcome any inherent problems. In brief, by adhering to these guiding principles from the Oslo Manual, this thesis developed and implemented a questionnaire that collected contextually rich, informative, small business innovation data which directly addressed the four research

questions. Next, the inclusion of case studies to further enhance the thesis findings is discussed.

Justifying case study inclusion According to Babbie (2002), a case study provides research evidence from an in-depth examination of a single representative example of a particular social phenomenon. Furthermore, Collis and Hussey (2003) posit that case studies are variously described as a form of exploratory research; and are particularly useful in research areas where theory development is limited because empirical evidence is underrepresented. In this context, while acknowledging the existence of substantial volumes of small-to-medium business innovation research generally, there remains limited empirical research pertaining to Australian regional small business innovation. Collis and Hussey continue their description by citing Scapens (1990) who asserts there are four other case study types including; descriptive, illustrative, experimental and explanatory. It is this last type, described as 'where existing theory is used to understand and explain what is happening' (Collis & Hussey, 2003, p. 68), that is combined within the exploratory form to justify the inclusion of these three case studies into the thesis. Each case study was selected post hoc following the initial interview because they were identified as exhibiting high levels of innovative capabilities relative to the knowledge which emerged from the innovation research literature.

Thus, three case studies are included in chapter 5 because they provide unique insights into how small businesses can be highly innovative, but in ways that are extremely difficult to measure. Recognised as a form of qualitative research methodology, Smith (2000) postulates the case study is particularly suited to modes of exploratory research where 'researchers can remain aware of other factors that may enter the model but have not been predicted beforehand' (p. 2). Smith further contends case studies provide clearer descriptive, and more insightful, understandings of the activities happening within the business; whereas, Babbie (2002) argues the primary purpose of a case study is as a descriptive tool. Moreover, the rich contextual data collected for a case study plays an important role in the theory building process typical when using inductive research methods (Smith, 2000). The three case studies provide an insightful glimpse into how successful small businesses foster an internal culture and attitude which transform into innovation activities and practices; which subsequently form the basis

for building high levels of innovative capabilities. In brief, inclusion of three case studies was deemed to bring an added dimension of descriptive clarity to the profile of an innovative small business; thereby, adding further to the richness of the thesis findings. Next, the primary data collection method is discussed.

3.4.1 Data collection

The survey instrument was delivered through semi-structured, face-to-face interviews, described as one of the more effective data collection methods (Bititci, et al., 2005). For example, Silverman (1973) asserts that: 'Interviews are used as the means of bringing to the surface underlying patterns submerged in a respondent's talk' (p. 33). Even though the innovation research literature indicates many previous innovation studies utilised mail-out questionnaires, Starbuck (1985) criticised such methods when he argued they 'were filled out by self-selected respondents who had little reason to respond accurately and who may not have known what they were talking about' (p. 370). Perry (2001) also noted similar limitations in his study, such as the 'desire to create a favorable image of oneself' (p. 205). The Oslo Manual clearly recommends the use of face-to-face interviews 'since they have proved to have a positive impact on the response rate and on the quality of the results obtained' (OECD/Eurostat, 2005, p. 145). In brief, semi-structured, face-to-face interviews support a mixed methods approach, which facilitates the collection of contextually rich data, whilst maintaining high response rates. Next, the sample selection process is discussed.

Selective sampling procedures Consistent with the approach of mixed methods research, the sample selection process used a mixture of sampling techniques. The sampling process included a combination of systematic, quota and judgemental sampling (Collis & Hussey, 2003; Zikmund, 2003). Firstly, a systematic sampling technique involves approaching every *kth* business from each selected starting point (Babbie, 2002), a procedure employed for this thesis. Secondly, quota sampling is described as 'a two-stage restricted form of judgemental sampling' (McMurray, et al., 2004, p. 84). The use of quota sampling ensured a broad, yet representative, sample covering a range of services, retail and manufacturing sectors. Thirdly, judgemental/convenience sampling entails using suitability selection criteria to ascertain the potential respondent's representativeness for inclusion in the sample (McMurray, et al., 2004). For example, each business approached was asked a series of

screening questions, such as how long they had been operating (required minimum was three years) and how many employees they had (required less than 20) to validate their suitability for the research sample. This approach contrasts with typical innovation research surveys that generally employ 'random sample techniques' (OECD/Eurostat, 2005, p. 121); whereby, potential sampling errors could occur, discussed next.

Minimising sampling errors There are a number of potential sample errors that could occur while collecting primary data, several of which are described in the Oslo Manual (2005). The first error is actually called random, or coverage, error due to the random selection process itself. This occurs when respondents who should actually be part of the representative population sample are not included because they were 'missed' due to the random selection process (McMurray, et al., 2004). The second random sample error is known as systematic error caused by all non-random errors, or otherwise known as bias error (OECD/Eurostat, 2005). These bias errors, according to McMurray et al. (2004) include: difficulties finding an appropriate sampling frame; members of the sampling frame are widespread, making collection difficult and costly; unrepresentative small samples; and unrepresentative sample caused by heterogeneous population. Another potential error is non-response, where questionnaires are returned incomplete or not returned at all. One final important error issue covered in the Oslo Manual (2005) is ensuring the person interviewed is the most appropriate respondent; for example, interviewing the major decision-maker rather than a subordinate provides more relevant data (Frazier, 1983). In brief, to minimise the potential of sampling errors this thesis adhered to recommendations from the Oslo Manual by employing a combination of three sample selection techniques: systematic, quota and judgemental. An examination of the analysis techniques applied is discussed next.

3.5 DATA ANALYSIS TECHNIQUES

This section discusses the data analysis techniques applied to analyse the primary data sample collected for this thesis. Consistent with the multi-methods approach used throughout this thesis, multiple, or multivariate, analysis techniques were applied to the primary data sample. Because of the multiple variables and various measurements contained within the primary data requiring analysis analysed, multivariate analysis techniques are applied (Argyrous, 2005; C. D. Gray & Kinnear, 2012; Hair, Anderson, Tatham, & Black, 1998). The initial analysis process undertaken involved content

analysis applied during the literature and IABS 2003 secondary data review process. The following paragraphs outline, in sequence: the literature review analysis process; the IABS 2003 report limitations; preparation of the primary data; assumptions about the sample size and selection procedures; the selection procedure of appropriate analysis technique; and lastly, the multivariate analysis techniques applied followed by a summary. Next, the use of content analysis techniques to analyse the research literature is discussed.

The content analysis technique was applied to analyse the innovation research literature and IABS 2003 report reviewed for this thesis. Content analysis is used to examine the general content of the research literature for emerging trends, common themes or important determinants for processes or procedures within the field(s) being studied (Cook, Mulrow, & Haynes, 1997; Cooper, 1998). According to Babbie (2002), content analysis is 'the study of recorded communications' (p. 441) and is classed as an unobtrusive research method; whereby, its unobtrusiveness allows for the study of social behaviour without intruding upon, or affecting, it. It is often referred to as hermeneutics – the interpretation of texts (Veal, 1997); alternatively, a process of textual or document analysis (McMurray, et al., 2004). Additionally, thematic content was also used to categorise each research paper reviewed during the SLR procedure into groups such as the area of study, the methodology and data collection methods applied, and analysis techniques used. The process involved pre-coding the key themes and categories, and then recording these codes in a table as each paper was reviewed. In brief, content analysis was applied to the literature review process to facilitate effective categorisation of the papers reviewed. Next, the analysis techniques applied to the secondary data is discussed.

3.5.1 Analysis and limitations of IABS 2003 data

To provide the basis for comparison this thesis analysed two different datasets, one set of primary data and another of secondary data. However, the analysis techniques applied to the secondary dataset were limited because of restrictive access to the IABS 2003 raw data. For instance, the secondary data from the IABS 2003 was in the form of Confidentialised Unit Record File (CURF) data, and had to be analysed through the ABS Remote Access Data Laboratory (RADL). This procedure proved frustratingly complicated as each analysis procedure of the CURF data was submitted to the RADL

using SPSS coding language commands. The raw data could not be accessed directly, and the outputs from each analysis request submitted were returned in tabulated form; consequently, restricting further analysis procedures being undertaken. The dataset contained a total sample population of 4,520 businesses which, after segmentation, resulted in 2,168 small businesses with between 5 and 19 employees. Initially, a series of descriptive statistical tests were run to examine specific variables known to drive innovation activities, such as frequency and correlation tests. Further statistical tests were discontinued due to the complicated procedures involved; whereby, content analysis of the ABS written report was conducted instead. In brief, analysis of the IABS 2003 data was deemed complicated and time consuming, with the results often difficult to interpret into contextually meaningful formats for direct comparison with the primary data results. Next, the preparation procedures applied to the raw primary data are discussed.

3.5.2 Raw data preparation

After collection of the raw primary data, a number of preparatory steps were applied to make it suitable for analysis. Initially, the raw data, which had been pre-coded, was input into a Microsoft® Excel spreadsheet where descriptive statistical analysis was conducted using the PHstat analysis program. These tests provided basic information for visual observation of common innovation drivers in terms of percentage rankings within the nominal variables, and high means within the ordinal variables. The raw primary data sample was then transferred to the SPSS statistical program to allow for multivariate analysis to be undertaken; whereby, further data preparation was required such as: applying variable labels; variable definition attributes; value labels; measurement levels; and recoding for missing values. However, once the basic data preparation was complete, several additional steps were required due to the mixture of information the dataset contained, discussed next.

Additional preparation of the raw primary data sample was required before analysis could begin in SPSS because of the mixture of information it contained. The primary data sample contained multinomial ordinal data (Argyrous, 2005) using five-point Likert scale responses, in addition to six questions with a checklist of multiple response answers using nominal data (C. D. Gray & Kinnear, 2012). Several steps were required to prepare the multiple response data to enable analysis in a meaningful way, with two

methods available according to Gray and Kinnear (2012). The first uses the multiple-dichotomy method of coding to recode the original answers. The second method is known as a multiple category coding where a set of component variables are created, with a different number representing a positive response for each answer (C. D. Gray & Kinnear, 2012). This second method was employed for two simple reasons. Firstly, the multiple response checklist answers had already been pre-coded to assist with the speed and accuracy of their recording. Secondly, the use of the multiple category method negated the need for a recoding of the raw data before analysing, and applies when 'the maximum number of responses given by a respondent to a survey is significantly less than the total number of possible responses' (C. D. Gray & Kinnear, 2012, p. 148). In brief, a sequence of preparatory steps was required to prepare the raw primary data before it could be effectively analysed. The second stage of statistical analysis, assumption testing, is discussed next.

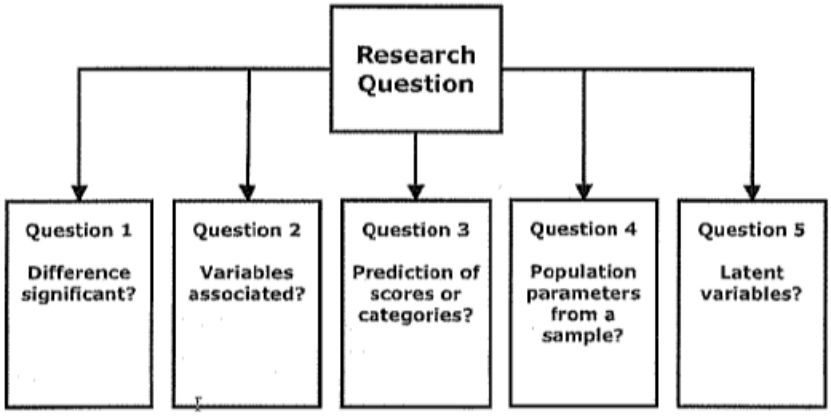
3.5.3 From tables to association tests

Following preparation of the raw data, a three-step sequence of statistical analysis techniques was applied. The aim was to ascertain statistically meaningful associations between certain variables, or groups and combinations of variables, and the levels of innovation capabilities within the data sample. Firstly, the Microsoft Excel descriptive statistics provided inferential percentage ranking results that formed the basis for the next stage of the analysis process, commonly referred to as assumption testing of the data (Coakes, Steed, & Price, 2008). Assumption testing considers such factors as related pairs, scale of measurement, normality and linearity. Secondly, following the transfer of the raw data sample into SPSS, further descriptive analysis was undertaken to produce contingency tables which indicated relative frequency levels as a percentage of the sample data. The basic association relationships, or correlations, between variables began to appear. Additional assumption testing was undertaken with the use of graphs, both histograms and scatter plots, to test for normality and linearity of the data. Thirdly, once certain association relationships were visually identified, the application of mostly nonparametric analytical tests was undertaken with the purpose of establishing the statistical significance of these associations and correlations. With these preliminary testing procedures complete, the application of analytical techniques to test for association significance could now take place, discussed next.

3.5.4 Multiple techniques for multivariate data

Following completion of the descriptive procedures, a range of mostly nonparametric tests were conducted to test for statistical significance of the associations between variables. These tests included: Freidman's ANOVA test for ordinal data; Spearman's rho, Somers' *d*; Kendall's tau-b/c tests; Chi-square for approximate goodness-of-fit and measure of association tests; and finally, factor analysis as a data reduction process. This section provides a summary describing why the various multivariate analysis techniques were applied. These summaries are preceded by flowcharts developed by Gray and Kinnear (2012) detailing the decision process of how the techniques were selected, discussed next.

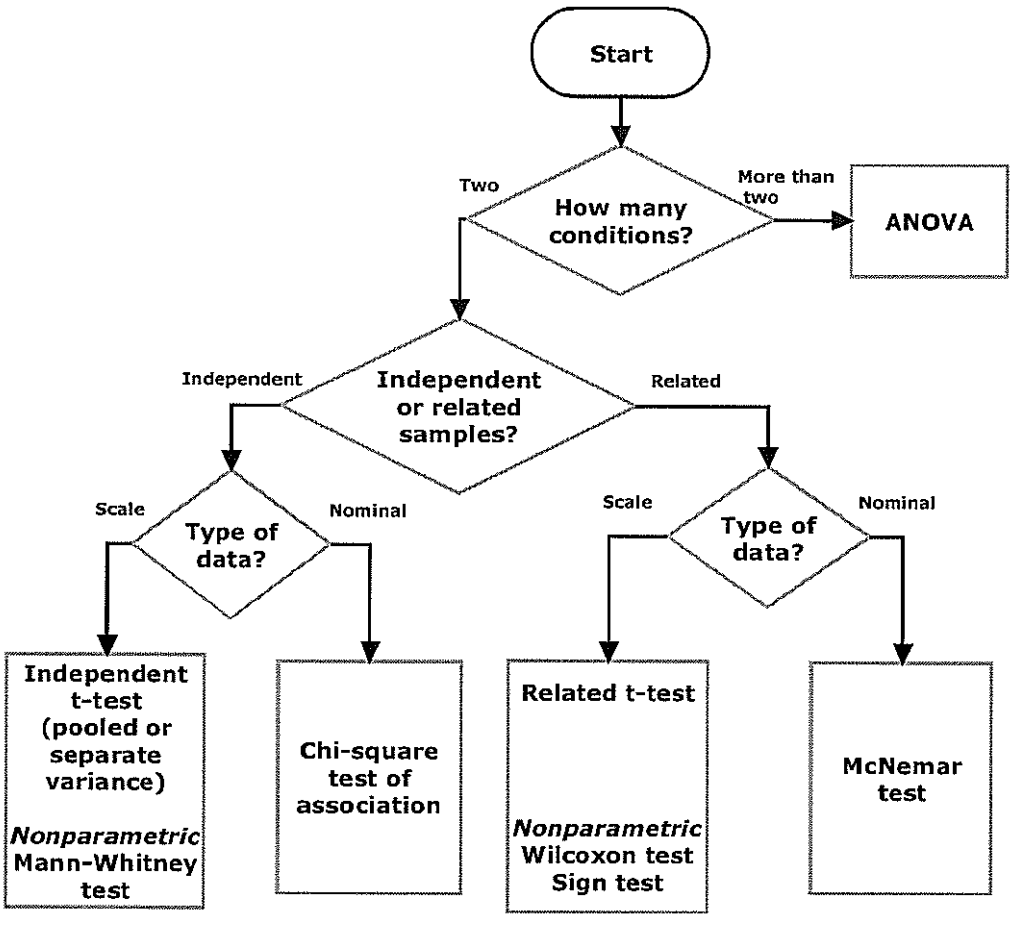
The first flowchart (Figure 3.1) outlines the five fundamental statistical questions that researchers seek answers for, whether that be for experimental or correlation research. These five questions include: 1) does a significant difference exist between two variable means?; 2) is there an association between different variables and, if so, how strong is that association?; 3) can one variable's test outcomes be used to predict other variables' outcomes?; 4) can test outcomes from a single sample be generalised for an entire population?; and 5) can test outcomes for a multivariate dataset be reduced to a set of latent variables or factors? Given this thesis takes an exploratory, or correlational, research approach the following flowcharts developed by Gray and Kinnear provided solid rationale for selection of appropriate multivariate analysis techniques. Indeed, the authors indicate support for the types of analytical techniques used when they assert such research 'typically seeks statistical associations among the variables in the study, with a view to imputing causality to be theoretically important variables' (C. D. Gray & Kinnear, 2012, p. 14). Before summarising the actual multivariate analysis techniques applied, the differences between samples types are discussed next.



Source: C. D. Gray & Kinnear, 2012 (p. 15)

Figure 3.1 **The five fundamental statistical research questions**

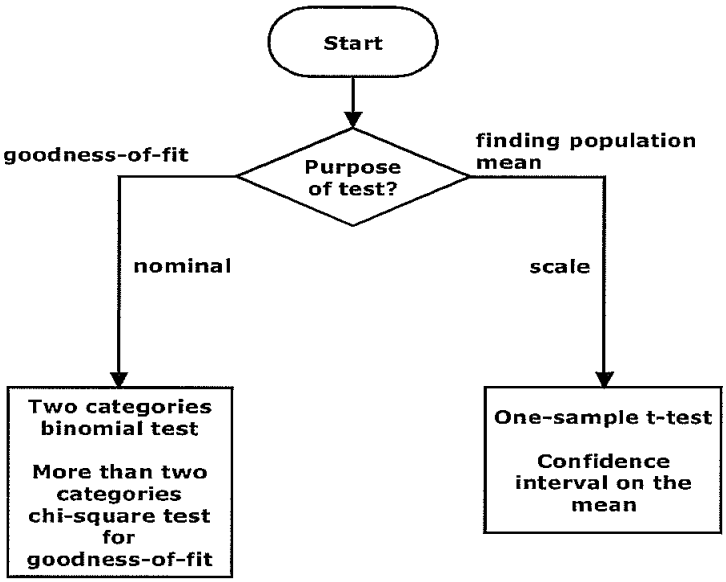
In choosing between appropriate statistical techniques for analysing datasets, the type of sample being analysed needs to be considered. The two main sample types are known as independent and related sample datasets. An independent sample, for example, consists of a group of respondents, or participants, where each individual is completely unrelated to every other individual within that group. A subset of the independent sample is where independent samples within the one sample group are exposed to a variety of different conditions, a process defined as a 'between subjects' experiment. Alternatively, a related, or paired, sample dataset is obtained when the entire sample is exposed to a variety of different conditions, a process defined as a 'within subjects' experiment. Such experiments are commonly described as having repeated measures. Because of their differences, independent and related sample datasets demand different statistical tests be applied. In brief, the individual respondents within the primary data sample collected for this thesis are determined as being independent; therefore, only certain multivariate analysis techniques are deemed appropriate for such a sample. The multivariate analysis techniques applied to investigate these variables are discussed next.



Source: C. D. Gray & Kinnear, 2012 (p. 17)

Figure 3.2 **Flow chart outlining testing for differences selection**

Testing for significance The primary dataset contained both ordinal and nominal data, resulting in a range of multivariate analysis techniques being applied. Depending on the type of variable being investigated, the flowchart in Figure 3.2 outlines the range of analysis techniques to be applied. For example, if scale data is being analysed, where the dataset is treated as an independent sample, parametric tests such as the Student t-tests and Analysis of Variance (ANOVA) tests would be applied. Alternatively, nominal and ordinal data obtained through the use of Likert and attitudinal scales are analysed using nonparametric tests such as Chi-square test of association, Wilcoxon, Mann-Whitney and Sign tests. The primary data collected was predominantly nominal, the majority being either categorical or ordinal data. Hence, the most appropriate statistical techniques to apply are the Chi-Square tests, which cover a range of analytical procedures including: goodness-of-fit tests; contingency and frequency table tests; tests for association; testing for data normality; and nominal data testing. Primarily used in the testing of nominal data, the Chi-square test of association is also applied to ordinal data in two-way contingency tables as outlined in the Figure 3.3

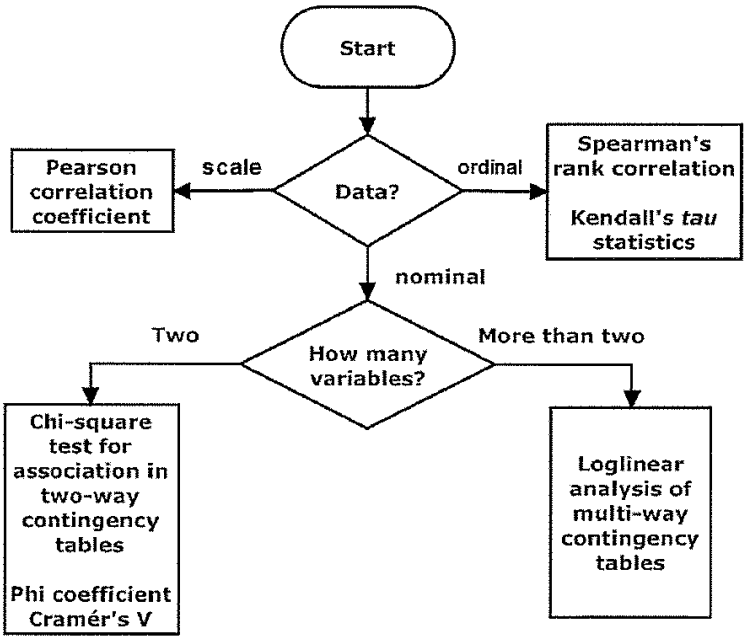


flowchart. The application of such a range of tests assisted in identifying similarities and differences in the values of variables identified as important determinants for developing innovative capabilities.

Source: C. D. Gray & Kinnear, 2012 (p. 22)

Figure 3.3 **Flow chart outlining one sample tests selection**

Testing for association A range of statistical test techniques are used to measure associations between variables for both ordinal and nominal data. The analysis of ordinal data requires it to be ranked to provide measures of association (Argyrous, 2005), detailed in the Figure 3.4 flowchart. Importantly, the actual measures of association of ranked data are obtained by assessing the differences, or distinction, that exists between concordant and discordant pairs within the sample data. For example, a concordant pair occurs when two cases are ranked the same on two variables within a joint distribution; whereas, a discordant pair occurs when two cases are ranked differently between two variables within the joint distribution (Argyrous, 2005). Thus, assessing the measure of association between variables of nominal data requires the data to have a lineal association. Initially, an association between variables can be identified visually through the use of contingency, or cross tabulation, tables which can then be confirmed using a Chi-square test.



Source: C. D. Gray & Kinnear, 2012 (p. 18)

Figure 3.4. **Flow chart outlining measures of association test selection**

Other measure of association tests include:

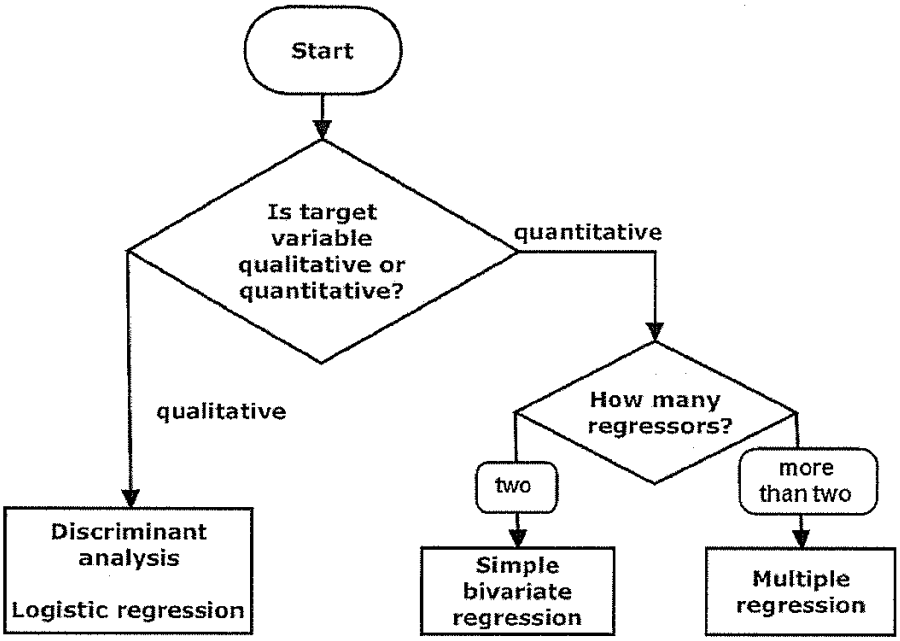
- Pearson's correlation – a test that measures the strength of association between particular variables. This test only applies to continuous or scale data on the proviso that the association is linear; hence, it was not applicable to this dataset.

- Spearman rank-order correlation coefficient, or Spearman's rho – is similar to Pearson's correlation in that the two formulae are arguably equivalent, even though the actual formula for each looks substantially different, yet with the caveat that no tied pairs are present in the rankings (C. D. Gray & Kinnear, 2012). Even though nonexclusive for measuring associations within ordinal data, it is the preferred method to obtain a more truly reflective rank correlation over the use of a Pearson's correlation test.

- Somers' *d* – is described as an asymmetric measure of association, whereby it is sensitive to the allocation of which variables are deemed independent or dependent (Argyrous, 2005). Hence, it is particularly appropriate for testing relationships between two variables considered to have a one-way dependent association. Argyrous (2005) explains: 'Somers' *d* calculates the association as a proportion of all concordant and discordant pairs plus pairs tied on the dependent variable' (p. 101). This test was deemed inappropriate for this data as the majority of variables analysed were considered independent.

- Kendall's tau tests – provide an alternative to the Spearman's rho, and come in three different versions: tau-a, tau-b and tau-c (C. D. Gray & Kinnear, 2012). All use the difference between the numbers of concordant and discordant pairs as their numerator; however, each one handles tied observations differently as their denominator. For example, the denominator in tau-a examines the total number of pairs; whereas, the tau-b denominator examines pairs tied on one variable but not the other, for both variables. Finally, tau-c is used to examine ordered categories of unequal size, and can only be obtained through the use of cross tabulation procedures.

Tests of prediction Another set of statistical tests that could have been applied following identification of measures of association between variables are predictive test techniques. Collectively known as regression methods, their purpose is to predict criterion variables from the outcomes of other related variables, commonly referred to as regressors, predictors, independent variables or covariates (C. D. Gray & Kinnear, 2012). The predictive techniques for analysis of quantitative variables are simple and multiple regression; whereas, analysis of qualitative variables involves discriminant analysis and logistic regression techniques as presented in Figure 3.5.



Source: C. D. Gray & Kinnear, 2012 (p. 21)

Figure 3.5 **Flow chart outlining procedures for prediction test selection**

Finding and testing latent variables The final analysis technique applied was factor analysis, which investigates correlations between variables obtained from an amalgam of tests. It is a technique for exploring and analysing large numbers of variables to determine whether patterns or relationships exist, and to assess whether the findings can be condensed or reduced, to form a more representative set of factors or components. For example, a factor represents a 'linear combination (variate) of the original variables' according to Hair et al. (1998); whereby, they 'also represent the underlying dimensions (constructs) that summarise or account for the original set of observed variables' (p. 89). Thus, factor analysis actually combines similar groups of variables where a relationship exists to form new, or representative, influential factors known as latent variables; or what Gray and Kinnear (2012) contend are 'hypothetical constructs' (p. 641). Further, it is described as an interdependence technique where all related variables are considered simultaneously to form linear composite variates, or factors, which explain or represent the entire variable set. The two main forms of factor analysis available, according to Hair et al. (1998) are:

- **Q factor analysis** – forms groups of respondents or cases based on their similarity on a set of characteristics;
- **R factor analysis** – analyses relationships among variables to identify groups of variables forming latent dimensions (*factors*) (p. 90).

More specifically, factor analysis is a set of multivariate statistical procedures used for analysing correlational interrelationships in datasets with a large number of variables. It has two primary uses: firstly, for identifying and summarising a set of common dimensions, called factors, within the underlying structure of a data matrix which are representative of the full set of variables being analysed. Secondly, it is commonly used for the purposes of data reduction; whereby, scores for a reduced number of underlying dimensions are calculated and then substituted for the original variables. For example, Hair et al. (1998) posit that 'factor analysis can assist in selecting a representative subset of variables or even creating new variables as replacements for the original variables while still retaining their original character' (p. 91). Unlike analysis techniques that focus specifically on variables as being either dependent or independent, factor analysis considers all variables simultaneously as being related to all others, while still adhering to the concept of the variate – the linear relationship among variables. Next, the steps taken to implement the factor analysis procedure are discussed.

There are three main steps involved in undertaking one of the several factor analysis methods available: (1) computation of the correlation matrix; (2) factor extraction; and (3) rotation. According to Coakes, Steed and Price (2008) there are several methods of factor extraction that include: principal components (PC); unweighted least squares; maximum likelihood; principal axis factoring (PAF); and alpha factoring. Applying the PC method, step 1 has the purpose of determining the appropriateness of the factor analysis procedure of the dataset being analysed. It achieves this by scrutinising the values within the correlation matrix to ascertain if they reach a minimum threshold value of at least 0.3. Step 2 involves determining the number of factors required to represent the original variables, and is usually done by inspection of the obtained eigenvalues displayed graphically in a scree plot. Lastly, step 3 involves the application of one of a range of rotation methods of the factor matrix structure for the purpose of

making it more interpretable. Of the several factor analysis methods available, the most frequently used are PC and PAF, discussed next.

The two most frequently used factor analysis methods are PC and PAF. The PC method is used ostensibly to summarise the original information, or common variance shared between the original variables, into a minimum number of factors representative of the original variables that can be used for prediction purposes. Alternatively, the PAF method is for the purpose of identifying what underlying factors may be shared in common by the original variables. The factor analysis process evaluates the different types of total variance that exists between the variables; common, specific (or unique) and error (Hair, et al., 1998). For example, common variance is that which is shared with all other variables within the dataset; whereas, specific variance is that which is associated with a specific variable only. Error variance, as the name suggests, is attributed to unreliable or inconsistent data gathering procedures, measurement error or some random component occurring within the phenomenon being observed. Moreover, the PC method evaluates the total variance including small proportions of unique and error variance; thereby, ensuring the full variance from the original variables is inserted into the factor matrix. In contrast, the PAF method only inserts communalities into the factor matrix; whereby, communalities are simply estimates of the shared variance from the original variables. In brief, the benefit of employing factor analysis is primarily for summarising large numbers of related variables, or for the purpose of data reduction where the calculated dimensions, or latent factors, are substituted for the original variables. Assumptions about the primary data analysed using multivariate techniques is discussed next.

3.5.5 Assumptions about the primary data

The very nature of multivariate analysis techniques – identifying complex associations or relationships between multiple variables – requires rigorous care in their application. This is because potential influences, for example, outliers, violations of assumptions and missing data can compound substantial effects across multiple variables, particularly when comparing different groups, or clusters, of variables (Hair, et al., 1998). The authors contend: 'With data collected, the first task is not to estimate the multivariate model but to evaluate the underlying assumptions...both statistical and conceptual, that substantially impact their ability to represent multivariate relationships'

(p. 26). Essentially, the data must be assessed to ascertain it complies with certain conventions, or assumptions, before specific analytical tests can be applied; otherwise, the outcomes from the tests will be at best non-representative, and at worst, completely incorrect and misleading. For example, multivariate tests for statistical inference of dataset variables asserts Hair et al. (1998) must meet assumptions of: 'normality; linearity; independence of the error terms; and equality of variances in a dependence relationship' (p. 26). Thus, undertaking a priori testing of the data, particularly when conducting hypothesis testing, is essential for reducing the possibility of Type I or Type II errors. In brief, making certain the data complies with various test guidelines, or assumptions, is a necessary prerequisite for ensuring the validity of the factor analysis outcomes. Next, more general assumptions concerning the methodology and sample data are discussed.

3.6 GENERAL ASSUMPTIONS

This section discusses methodological and data assumptions which required clarification with the purpose of strengthening and validating the thesis findings and outputs. Methodological generalisations cannot be made from the wide cross-section of innovation literature studies reviewed throughout the literature review process. However, several assumptions concerning small businesses generally need stating to clarify the systematic approach undertaken for this thesis, and how it affects the implementation process of the research design. The stated assumptions include: the definition of small businesses; how small businesses may operate differently between states; the application of questionnaire show cards; and the differences between service and manufacturing businesses. The definition of an Australian small business is discussed next.

Deciding on a definition The definition of an Australian small business used for this thesis was adopted in accordance with ABS guidelines. An Australian small business is defined as:

- employing less than 20 people;
- independently owned and operated;
- closely controlled by the owner/managers; and
- the owner/managers control most, if not all, of the operating capital.

In contrast however, ABS guidelines indicate a small manufacturing business can employ up to 100 people, with the other factors remaining the same; whereas, a micro business is one that employs five or less people. Hence, the first assumption stated is that all data collected and analysed is from a small business employing 20 or less employees, and no distinction is made between a small and a micro business. Indeed, there may be substantial operational and structural differences between businesses with only 10 employees compared to one with 100 employees, discussed next.

The reasons for adopting the ABS small business definition are twofold: the different organisational structures and the importance of the small business sector. Firstly, a business with hundreds of employees invariably has different types of management structures and operating procedures than a small business with less than 20 employees. Secondly, the small business sector makes an important contribution to a country's economy and employment opportunities, yet it is a sector that appears under-researched. For example, manufacturers generally tend to engage in more R&D activity (D. N. Clark, 2008) than other industry sectors, but are the levels of R&D activity the same for a small manufacturer as they are for larger businesses? Additionally, Rothwell and Zegveld (1982) describe a number of inherent disadvantages faced by small businesses developing innovative capabilities which include: lack of cash; lack of qualified manpower resources; and the inability to obtain economies of scale. Consequently, one of the emerging criticisms of business management and innovation research is the lack of comparability within the various streams of research being undertaken due to the multiple definitions of small business used across different countries. For example, some researchers apply a small business definition based on turnover or revenues; whereas, other researchers apply employee numbers as definitions, where numbers vary between countries or regions. In brief, this thesis adopted the small business definition guidelines provided by the ABS, with the aim of giving a comparative overview appropriate for the Australian small business sector generally. Next, the different regulatory environments small businesses operate within are discussed.

Equality across operating environments One constant debate within the industry grey literature is the lack of a national policy and regulatory framework to cover the small business sector. For example, industry representative groups such as the Business

Council of Australia (BCA) and the Chamber of Commerce and Industry Queensland consistently call for less business regulation and red tape (Behrens, 2009). For example, Behrens reports:

> Red tape and regulatory burdens impeded competition, innovation and productivity, and therefore business output, income and employment. ...Queensland, which the Productivity Commission reports has more than 70,000 pages of regulations has "the most onerous regulatory regime in Australia",...Indirect costs arise when regulation is so stifling that firms are constrained from developing new products or processes, entering new markets or establishing new businesses (p. 7).

The consequence of no uniform national policies or regulations covering the small business sector is that each individual state administers their own separate regulations; whereby, a business operating branches in multiple states has to comply with a multiplicity of regulations. The Productivity Commission's *Regulatory Engagement with Small Business* research report acknowledges: 'Small business stakeholders consistently raise with Governments their view that compliance approaches and the regulatory posture adopted... can have a significant impact on regulatory burden' (Anon, 2013, p. v). Because of this lack of operating environment uniformity, the second assumption made is that the small businesses participating in the survey are assumed to operate in a similar manner to small businesses Australia wide, regardless of what industry sector or regulatory regime they operate within. In brief, even though each state has its own small business regulatory bodies and operating guidelines, small business operators in Queensland are assumed to function and operate in a similar way to small businesses in all other states. Next, an assumption concerning the use of show cards is discussed.

Survey support via show cards The application of questionnaire show cards has the potential to draw criticism surrounding questionnaire bias. Questionnaire bias is defined by Babbie (2002) as 'any property of questions that encourages respondents to answer in a particular way (2002, p. 246). Show cards were used to support the questionnaire for two reasons. Firstly, the Oslo Manual (OECD/Eurostat, 2005) advises the use of answer guidance 'in order to help the respondent understand and avoid losing the instructions' (2005, p. 146). Secondly, the show cards provide a similar format used by the IABS 2003 questionnaire where a range of possible answers or examples are listed.

After the respondent viewed each show card, a ‘probe and contingency question’ was asked, which according to Babbie (2002, p. 248) assists in the avoidance of leading questions. The show cards were pre-coded and pre-tested as recommended by Babbie, and the wording was ‘adapted to meet the knowledge and experience of an average respondent’ (OECD/Eurostat, 2005, p. 146). My familiarity with the use of show cards was acquired from 16 years employment as a field interviewer with Roy Morgan Research, where show cards have been used for at least two decades. The decision to use show cards is supported by McMurray et al. (2004) who clearly advocates the need for more ‘industry/academic collaboration’ (p. 306). In brief, the show cards allowed unbiased guidance for the survey respondents, while providing a full complement of possible answers and reducing the time taken to complete the interview. Next, an assumption about the services and manufacturing sectors is discussed.

Industry sector differences The final assumption concerns the substantial differences between two major industry sectors, the services and manufacturing sectors. An assumption is required because there are major implications in terms of how innovation occurs and, perhaps more importantly, how it may be measured. For example, examination of the research literature indicates general acceptance that incremental innovation is most strongly aligned to the services sector; whereby, it is relatively difficult to measure accurately (J. de Jong & Vermeulen, 2003; Hipp & Grupp, 2005). The measurement difficulty, assert Tamura, Sheehan, Martinez, & Kergroach (2005), stems from the fact service sector innovation is ‘non-technical and result from small, incremental changes in processes and procedures that do not require much formal research and development’ (p. 134). Indeed, considering that proxy measures of innovation include R&D expenditure, patent counts and new products to market, then the problems inherent in trying to compare and measure innovation processes and outputs from the services and manufacturing sectors are quite substantial. Additionally, Tamura et al. (2005) cite evidence suggesting most innovation activities undertaken within the services sector are ‘organisational and disembodied’ (p. 135); thereby, escaping or circumventing attempts to accurately measure or record such activities using standard innovation measures. In brief, it is apparent there are significant differences between innovation processes and outputs within the services and manufacturing sectors, which becomes quite clear when one examines the four dimensions of innovation, discussed next.

The third edition of the Oslo Manuel (2005) added two extra dimensions of innovation used to define an innovative business: organisational and marketing innovation. Interestingly, a fifth type of innovation known as 'ad hoc' innovation has been identified as being strongly associated with the services sector (Tamura, et al., 2005); this is described as 'a specific solution to a particular problem posed by a customer' (p. 139). This customer-centric process is encompassed by the concept of market orientation that Kara, Spillan, & DeShields (2005) report is contingent with high performing innovative small businesses, particularly within the retail services sector. However, this is not to say that manufacturing businesses lack market orientations which are customer-centric, particularly when considering the substantial research literature focused on user- or customer-driven innovation from von Hipple (1988) amongst others. Nevertheless, the main issue relates to the stark differences between the services and the manufacturing sectors, and how these might be overcome when collecting primary data from both sectors. Drawing from the work conducted by Kara, et al. (2005), several relevant questions are included from their research into this thesis questionnaire that specifically addressed a respondent business's propensity and attitude toward market orientation. In addition, the questionnaire for this thesis was developed to encapsulate both service providers and manufacturers with specific questions framed to address the identified differences, such as frequency levels of R&D expenditure and incremental service delivery development processes. In brief, while acknowledging the existence of substantial differences between innovation processes in the services and manufacturing sectors, these differences have been clearly identified and addressed by structuring the questionnaire to specifically account for these differences.

In summary, the major methodological and data assumptions have been clearly stated and individually addressed. The first assumption pertains to the definition of a small business; whereby all businesses interviewed had twenty employees or less, including those businesses classified as a manufacturer. Secondly, even though each Australian state has their own business regulatory authority, it is assumed that the sample of Queensland businesses interviewed will operate within similar regulatory frameworks. Thirdly, the use of show cards to assist in the interviewing process is assumed not to create any undue bias in the primary data collection due to adherence to the Oslo Manual guidelines. The use of the show cards not only streamlined the interview process by reducing the timeframe of each interview, they also provided consistency

and richness in the data obtained with the inclusion of an open-ended probe question. Finally, the research literature clearly identifies the differences between innovation processes in the services and manufacturing sectors (Tamura, et al., 2005); nevertheless, these differences were addressed through careful structuring of the questionnaire to accommodate such differences. Subsequently, the four assumptions concerning methodological approach and data integrity have been carefully considered and clarified; therefore, they pose no further problem in terms of impacting on the generalisability of the results, or the outputs, of the thesis. Next, a summarised overview of the chapter contents is presented.

3.7 SUMMARY OF THE RESEARCH DESIGN

This section reiterates the chapter contents, starting with a brief assessment of how complex innovation is as a research topic. One indisputable aspect identified when considering the research design focused on innovation is how multidimensional and complex the research process can become. Indeed, this is partly because of the various contextual issues associated with the processes and procedures involved in innovation, and partly because of the significant difficulties involved in measuring the outputs and outcomes from innovation. For example, the number of patents taken out is espoused as a proxy measure of innovation; however, Hermans and Castiaux (2007) argue patents 'may be itself sufficient for creating restriction on knowledge diffusion' (p. 51), thereby stifling the adoption of new information and knowledge within other businesses. Thus, because of innovation's inherent complexities, the final approach developed for the research design, and the subsequent methodologies employed, had themselves the need to be innovative. (Tan, et al., 2009). The following points provide a summary of the research design, finishing with an overall conclusion as to why such an approach was adopted.

- SLRs primarily considered the preserve for medical literature research, are now recommended as a key literature research process for management and business research, particularly where an evidence-based approach is required. The findings provided a solid foundation for the development of the research design, while additionally providing invaluable insights into the methodological techniques applied to particular research tasks.

- Multi-methods research is seen as an emerging research approach for blending qualitative and quantitative data to form the basis of contextually rich, evidence-based, research outcomes.
- Continuing with the multi-methods approach, a mix of related paradigms were selected to guide the research design development, and its implementation. The two paradigms, merged to form a single approach to guide the research design, were pragmatic pluralism and innovative constructivism.
- The questionnaire investigated multiple aspects of small business operational procedures relative to innovation activities and outputs, in conjunction with aspects associated with building innovation capabilities. A wide range of subjects, activities and personal attitudes were canvassed, with several questions structured to provide multiple response answers. Questions where answers were provided by show cards were supplemented with an open-ended probe question to make sure all possible answers were covered by the respondent. Consequently, the respondents' answers were translated into a dataset of multiple variables, necessitating the application of multivariate analysis techniques.
- The overall conclusion: the research design and methodology used in this thesis has taken an evidence-based approach; whereby, the findings and outputs will be usable by the small business practitioner with respect to building on their innovative capabilities.

Finally, the overarching objective of this thesis is to produce research outcomes that make a valuable contribution to the current innovation knowledge; and thereby, provide useful information to help the small business operator in this dynamic, globally competitive, operating environment. By utilising a research design that employed a multi-methods approach, underpinned by the use of combined literature review processes to provide an evidence-based grounding, I am confident this particular objective has been achieved.

CHAPTER 4

Sample data profile, findings and outputs

Outline of Chapter 4	
Section	**Content**
4.1	***Introduction*** Highlights the purpose of the chapter and introduces the three thesis outputs.
4.2	***Summary of sample details and business characteristics*** Examination of the overall sample details and business characteristics including years in operation and estimated annual revenue. Summarises the various business perspectives and attitudes of respondents including sources of ideas and knowledge, importance of planning, collaboration and customer feedback. Examines the contribution of business practices to drive innovation process activities such as HRM practices and adoption rate timeframes.
4.3	***Results from nonparametric tests*** Examines the results from the measures of association findings following application of the multivariate nonparametric tests which include: Chi-square goodness-of-fit and measure of association tests; Spearman's rank correlation test; Kendall's tau-b; and the use of Cohen's Effect Size guidelines. This is followed by examination of the output from the application of Principal Component factor analysis.
4.4	***Summary of analysis findings*** Presents a condensed summary of the more significant findings to support the construction of the three outputs.
4.5	***Development of the thesis outputs*** Discusses the construction, purpose and perceived application of the three outputs: a propositional inventory; a conceptual small business innovation model; and a small business innovation planning framework.
4.6	***Summary*** Presents a summary of the chapter contents.

4.1 INTRODUCTION

This chapter presents the results obtained from the analysis undertaken on the primary data, and examines the subsequent findings derived from these results. But first, recapping chapter 3 shows the outcome from using a multi-methods approach for the research design has yielded excellent findings, resulting in the development of two significant outputs. As this chapter will now demonstrate, the collection of primary data provided invaluable insights into the drivers of innovation processes within the small business sector; whereby, the findings offered a platform for the development of two outputs, a conceptual model and an innovation planning framework. Additionally, a number of potential proxy measures for assessing small business innovative capabilities emerged from the findings; albeit, some are more likely to serve as predictive indicators and require further research and testing. The findings indicate a substantial majority of

the sample demonstrated a similar propensity for quickly adopting not only new products or processes, but new ideas and knowledge as well: discussed further in this chapter. In brief, the use of a multi-methods research design has yielded valuable findings that demonstrate a majority of the sample businesses are categorised as early adopters; therefore, are indicative of high levels of innovative capability.

The chapter starts by tabulating the results of the initial descriptive analysis, before presenting a summary of the nonparametric tests. The purpose and application method for each of the nonparametric tests applied were previously discussed in Section 3.4 of chapter 3; albeit, a detailed description involving the application of factor analysis is presented in Section 4.3.1. Further, only the most significant results from the nonparametric tests are presented in tabulated form. The findings from these results were used to construct the three thesis outputs which are: (1) a propositional inventory; (2) a conceptual small business innovation model; and (3) a small business innovation planning framework. The chapter concludes with a summary of the findings, and a brief discussion of how these findings can be improved upon with future research. Next, a summary of the primary data sample details and business characteristics are presented.

4.2 SAMPLE DATA PROFILE SUMMARY

This section presents the details of the primary data sample in addition to an overview of the business characteristics of respondents within the sample. Firstly, the sample size was estimated using the *sample size determination for proportion* formula from *Basic Business Statistics* (Berenson, et al., p. 19). For example, using a desired confidence level of 95 per cent, an acceptable sampling error of 0.1, and a population proportion value of 0.5 yielded a sample size of 96, rounded to 100. Such a sample is considered appropriate for this type of exploratory research. The sample consisted of 25 interviews each from Townsville, Ingham, Charters Towers and Ayr. The industry classifications used are based on the Australian and New Zealand Industrial Classification (ANZSIC) divisions developed by the ABS. Table 4.1 shows the cross-section of industry sectors represented in the primary data sample, with the three highest represented sectors being retail with 31 per cent, cultural/personal and recreational services with 22 per cent and manufacturing with 18 per cent. Businesses represented in the cultural/personal and recreational services sector included hairdressers, lawn mowing and gardening services,

and a home handyman service. Next, a breakdown of how the respondent first became associated with the business is discussed.

Table 4.1 **Industry sectors represented in the primary data sample**

Industry Sector	Frequency	Percentage
Manufacturing	18	18.0
Construction	2	2.0
Wholesale	3	3.0
Retail	31	31.0
Accommodation & food services	11	11.0
Transport & storage	3	3.0
Communication services	1	1.0
Finance & insurance	1	1.0
Property & business services	8	8.0
Cultural/personal & recreational services	22	22.0
Total	100	100.0

Start-ups beat established businesses The results presented in Table 4.2 show that 42 per cent of the sample businesses were started from scratch by the respondent. A further 40 per cent of the businesses were purchased as an established operation; whereas, eight per cent of respondents were family members working within a family business. Interestingly, seven per cent answered other means which included two businesses which were bequeathed to the respondents by relatives and five businesses that resulted from the merger of previously existing businesses. Next, a breakdown of the respondent's position within the business is discussed.

Table 4.2 **The way the respondent entered into the business**

How the business started	Frequency	Percentage
Started from scratch	42	42.0
Applied for position	3	3.0
Family member	8	8.0
Bought established business	40	40.0
Other	7	7.0
Total	100	100.0

Importantly, there was distinction made between an owner/partner and a sole operator in Table 4.3, the reasons of which are discussed later concerning Table 4.4. Hence, sole operators represent 16 per cent and owner/partners represent 66 per cent of the sample; however, the true figure for owner/partner representation is 82 per cent of the sample once these two figures are combined. A point to note is the one respondent in the

position of Supervisor had actually been with the business for almost 30 years. The respondent had taken on the role of the main operational decision-maker following the death of the original owner, with the business now being managed by the original owner's wife. Next, an overview of the number of employees employed by the businesses interviewed is discussed.

Table 4.3 **Respondent position within the business**

Respondent position	Frequency	Percentage
Sole operator	16	16.0
Owner/partner	66	66.0
Managing director	9	9.0
General manager	5	5.0
Department manager	3	3.0
Supervisor/2IC	1	1.0
Total	100	100.0

Employing businesses the majority An important distinction in Table 4.4 is that a sole operator is listed as a single full-time employee, in addition to listing one full-time employee in an employing business. This distinction is made because the listing of one full-time employee was in addition to the respondent being interviewed, who in the majority of cases, also worked in the business full time. Further, even if an owner was not permanently at the business premises, it was assumed they operated the business on a full-time basis. For example, the second case study in Chapter 5 operated both a wholesale and retail business; the majority of his time was spent in the wholesale business, while his true passion was devoted to his retail business. The average number of full-time employees within the sample was rounded to 3 (actual 2.7), with an average of 2 (actual 1.7) part-time employees. Next, the average number of years the business had been in operation is discussed.

Table 4.4 **Number of full-time and part-time employees**

Employees	**Full-time**	Percent	**Part-time**	Percentage
Sole operator	16	16.0	0	0.0
1	17	17.0	22	22.0
2	32	32.0	21	21.0
3	10	10.0	11	11.0
4	7	7.0	1	1.0
5	6	6.0	3	3.0
6	3	3.0	3	3.0
7	3	3.0	3	3.0
9	2	2.0	1	1.0
10	1	1.0	0	0.0
12	3	3.0	0	0.0

The following figure presents an interesting visual representation of the years in operation for the businesses within the primary data sample. Figure 4.1 shows that the majority of the small businesses within the sample had been in operation for between 3 and 4 years; whereas, the median time of operation was between 7 and 8 years. Importantly, businesses in operation for less than three years were excluded from the sample; this criterion was achieved through the use of screening questions. The reason businesses with less than three years of operation were excluded was because the Oslo Manual (OECD/Eurostat, 2005) states: 'It is recommended that the length of the observation period for innovation surveys should not exceed three years or be less than one year' (p. 61). A majority of the innovation research studies reviewed used an observation period of three years including the IABS 2003; however, there was a limitation identified in their dataset, discussed next.

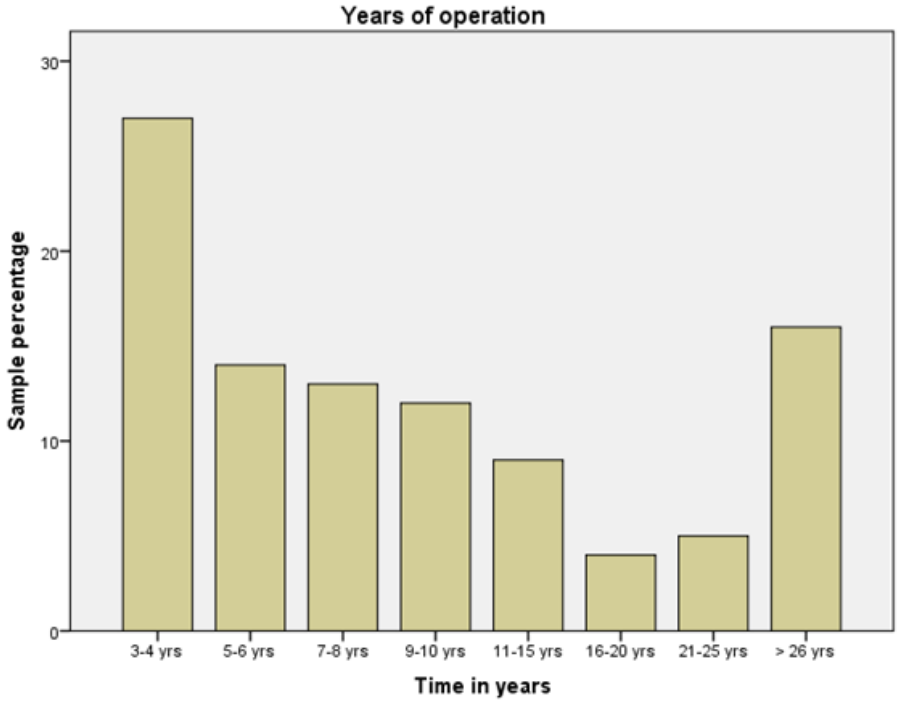


Figure 4.1 **Sample businesses years of operation**

Time in operation critical A limitation identified with the IABS 2003 data was businesses that had been in operation for less than 12 months were included in the sample (Trewin & Paterson, 2006). An assumption could be drawn from this that start-up businesses would have a higher probability for introducing new products, services, management processes or operational procedures during the establishment phase, as opposed to businesses that had been in operation for at least three years. The inference here is the ABS findings may potentially be skewed towards higher levels of innovation due to the inclusion of these start-up businesses. There were two reasons for excluding businesses with less than three years of operation from this thesis's sample. Firstly, to conform to the data collection guidelines set out by the Oslo Manual. Secondly, the observation period of three years enabled easy comparison with other innovation datasets that have used a similar observation period. Next, the age groups of the respondents are discussed.

Details of the various age groups of the respondents interviewed are presented in Figure 4.2. The median age group represented are aged between 50 and 54 years with 20 per cent, while the second largest group represented are aged between 55 and 59 years accounting for 16 per cent of the sample. The mean age of the sample is 46 years; whereas, two respondents were aged over 70 years. Interestingly, only eight per cent of

the sample was under the age of 30 in contrast to 16 per cent between the ages of 60 and 69. Next, the estimated total revenue for the businesses within the sample is discussed.

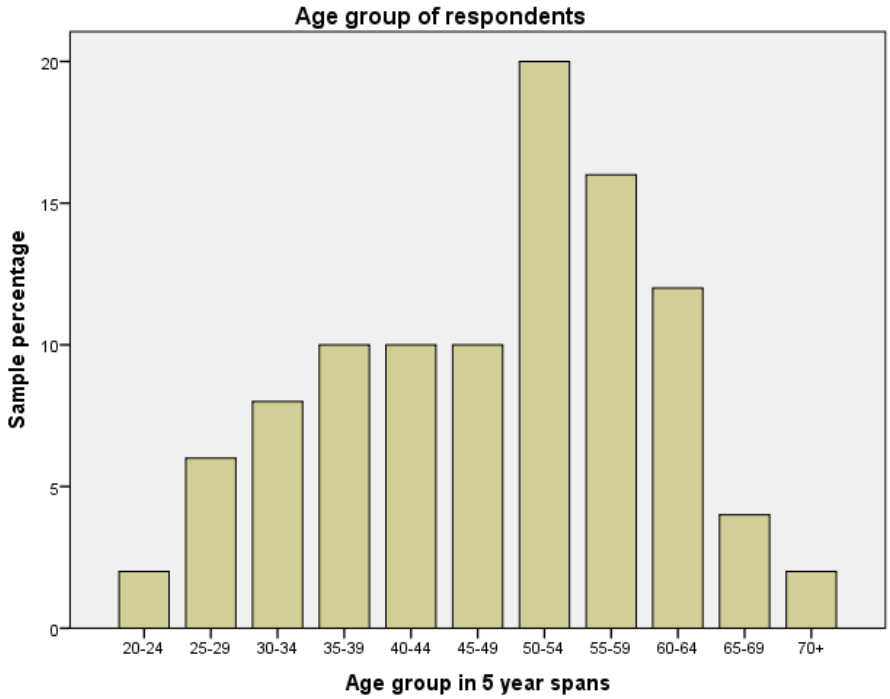


Figure 4.2 **Age group of respondents interviewed**

Wide revenue range The estimated annual revenues for the businesses within the sample are presented in Figure 4.3. The inclusion of sole operators in the sample meant a sizeable percentage of the sample (29 per cent) had estimated annual total revenue of up to $100,000; whereby, 14 per cent of these generated estimated total revenue of less than $50,000 per annum. The mean estimated total revenue per annum is approximately $180,000, with the median estimated total revenue being between $100,000 and $250,000 per annum. However, at the other end of the continuum there was a total of 12 per cent with annual total revenue greater than one million dollars, with 2 per cent of these exceeding two million dollars revenue per annum. The reason an estimate of the total annual revenue was collected was to keep the timeframe in administering the survey to a minimum as recommended by the Oslo Manual. Of the 100 businesses interviewed for the sample only 5 per cent did not provide an answer to this question. The next section provides a summary of the business operator's perspectives and attitudes concerning innovation, and its importance to their business.

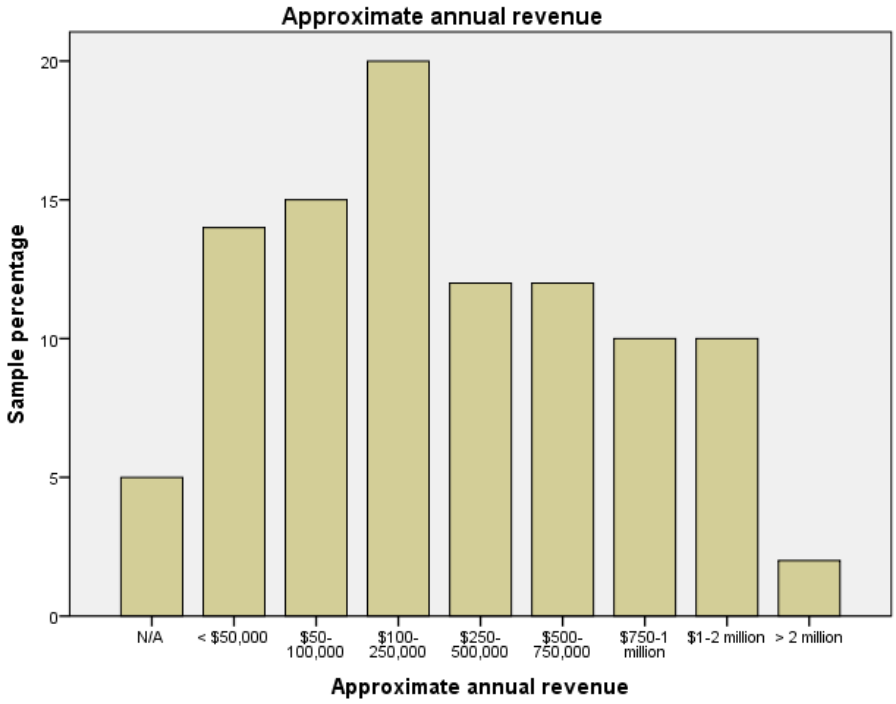


Figure 4.3 **Estimated total annual revenue**

4.2.1 Summary of business perspectives and attitudes

The first perspective of interest concerns the operators' knowledge of what the term innovation means. The results of this question are presented in Table 4.5, whereby almost 1 in 5 (18 per cent) responded that they did not know what innovation meant. Of the 82 per cent who responded positively, they were then asked to describe in their own words how they defined innovation. The main themes that emerged from these answers included: the introduction of something new; trying new ways of doing things; trying to maintain a competitive advantage through new products or services; and seeking to differentiate the business from its competitors. The sourcing of new ideas is discussed next.

Table 4.5 **Operator knowledge of innovation**

Knowledge of term 'innovation'	Frequency	Percentage
No	18	18.0
Yes	82	82.0
Total	100	100.0

All operators were asked where they sourced most of their business ideas from, the results of which are presented in Table 4.6. A majority of the operators, 75 per cent, responded that they sourced most of their ideas externally. This question was then followed by showing the respondents a list of methods for obtaining new ideas and acquiring new knowledge, the multiple response results of which are presented in Table 4.7.

Table 4.6 **Frequency for sourcing most ideas and knowledge externally**

Source most ideas and knowledge externally	Frequency	Percentage
No	25	25.0
Yes	75	75.0
Total	100	100.0

Customers supply ideas The two most frequently used external sources for obtaining ideas and knowledge for driving innovative capabilities were from customers and suppliers. Presented in Table 4.7, this finding is supported in the wider research literature. For instance, there is a construct known as the fifth-generation innovation process (Dodgson & Hinze, 2001), a process where customers and suppliers form integrated knowledge links for building innovative capabilities. According to von Hipple (1988, 2006) this construct is further contributed to by what he calls user-driven innovation, where the ideas originate from end-users who adapt products to suit new applications. Another high-frequency external source of ideas was the use of industry websites or trade publications; whereas, an internal source involved the staff and employees within the business. When these four sources were aggregated they accounted for just over 50 per cent of the total number of sources used for obtaining new ideas and knowledge for the business. As most businesses use more than one source for obtaining new ideas and knowledge, it is appropriate each of the four main idea sources was used by more than 50 per cent of the sample. In contrast, independent research organisations and commercial labs or industry research organisations were used least as an external source for ideas and knowledge, accounting for a combined total of only 1.6 per cent of the sample. Next, the employment of staff with some form of tertiary education is discussed.

Table 4.7 **Frequency of sources for ideas and knowledge**

Source of ideas & knowledge frequency	Responses		Percentage of Cases (N=99)
	N	Percentage	
Staff/employee within business	51	11.6%	51.5%
Membership of industry group	35	8.0%	35.4%
Friends & associates	45	10.3%	45.5%
Existing clients & new customers	57	13.0%	57.6%
Suppliers of goods/equipment/materials	58	13.2%	58.6%
Consultants/advisers	7	1.6%	7.1%
Competitors/businesses in same industry	44	10.0%	44.4%
University/TAFE colleges	12	2.7%	12.1%
Government agencies & departments	12	2.7%	12.1%
Independent non-profit research organisations	4	0.9%	4.0%
Commercial labs & industry R&D organisations	3	0.7%	3.0%
Professional conferences/trade fairs/exhibitions/seminars	38	8.7%	38.4%
Industry websites/trade publications	56	12.8%	56.6%
Academic/industry research journals	10	2.3%	10.1%
Other alternative sources	7	1.6%	7.1%
Total	439	100.0%	443.4%

One of the secondary aims of this thesis is to explore the existence of any links between education levels and the drivers of innovation activities. Unfortunately, the findings from the primary data have been unable to establish any such links. Indeed, the generally accepted concept within the research literature suggests the hiring of staff with higher education qualifications, in particular those with specialised skills or trade expertise, is one way of boosting a business's innovative capabilities (C. Gray, 2006). However, the results presented in Table 4.8 show a substantial majority of the sample said they did not specifically look for people with tertiary qualifications when employing new staff; whereas, less than a quarter of the respondents said they did seek tertiary-qualified staff. In hindsight, acknowledgement needs to be made that the wording of the question made no reference to innovation; therefore, the results may not be truly reflective in the context of building innovative capabilities. Nonetheless, a common response to this question concerned seeking staff with high levels of customer service skills, which many respondents believed were largely inherent, and were generally not associated as part of a tertiary degree skills set. Next, the measure of association between innovation process drivers is discussed.

Table 4.8 **Employing staff with higher education qualifications**

Employ staff with higher education	Frequency	Percentage
No	77	77.0
Yes	23	23.0
Total	100	100.0

Likert scales rate attitudes A series of attitudinal questions concerning various innovation process drivers were asked, with respondents using a five-point Likert scale to rate their level of importance. The Likert scale consisted of 1 representing 'Not at all important' and 5 representing 'Extremely important'; whereby, some of the more prominent results to these questions are presented in a combination of frequency and contingency tables in the Appendix section. Firstly, a Chi-square approximate goodness-of-fit test is applied to these tables to test the null hypotheses that the frequency of the answers given occurred with equal probability, thus indicating uniform distribution (C. D. Gray & Kinnear, 2012). The results of these tests are presented in Table 4.9, which show the null hypotheses are rejected indicating the frequency of the answers given did not occur with equal probability.

Table 4.9 **Hypotheses testing using Chi-square approximate goodness-of-fit test**

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The categories of **Importance of collaboration** occur with equal probabilities.	One-Sample Chi-Square Test	.001	Reject the null hypothesis.
2	The categories of **Importance of informal planning** occur with equal probabilities.	One-Sample Chi-Square Test	.001	Reject the null hypothesis.
3	The categories of **Importance of formal planning** occur with equal probabilities.	One-Sample Chi-Square Test	.005	Reject the null hypothesis.
4	The categories of **Importance of innovative products/services** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
5	The categories of **Importance of customer feedback** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
6	The categories of **Importance of customer complaints** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Secondly, the main output from the frequency table data was a frequency bar graph, with results presented in the following pages. For example, Figure 4.4 depicts a relatively normal distribution for the importance of collaboration in helping the business build innovative capabilities. The Spearman's rank-order correlation coefficient test (Spearman's rho) was run to ascertain the strength of the measure of

association between other variables. However, only a weak medium measure of association was returned when the importance of collaboration was tested against the importance of innovation within a contingency table relative to the overall success of the business. Additionally, to classify the effect size of the association strength of the correlation coefficient, Cohen's Effect Size guidelines are used (C. D. Gray & Kinnear, 2012). The results of the Spearman's rho test are: rho (100) = 0.32, $p < 0.01$; Effect Size $rho^2 = 0.01$, at the low end of a medium effect. Even though this result is only of moderate strength, a stronger measure of association effect size is found with other innovation process drivers, discussed next.

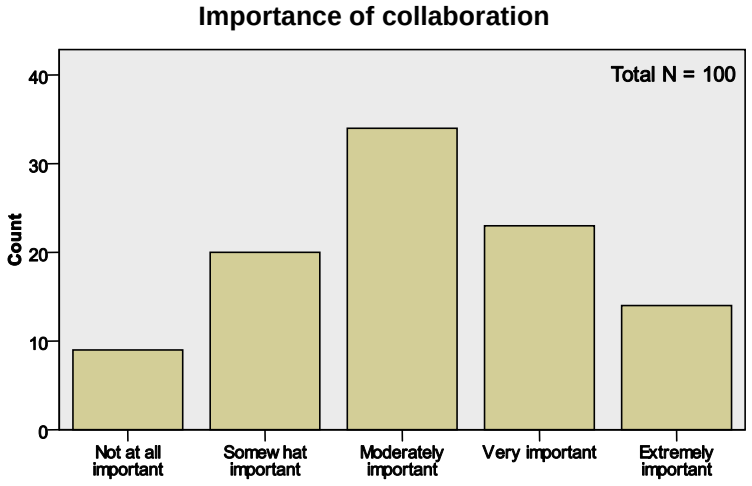


Figure 4.4 **Frequency of collaboration in building innovative capabilities**

Informal planning favourite One of the highest measures of association from contingency table testing is the importance of informal planning against the importance of formal planning. The Spearman's rho test results are: rho (100) = 0.69, $p < 0.01$; Effect size $rho^2 = 0.48$, a large effect. Interestingly, informal planning use had a higher importance rating than the importance rating given to formal planning; the frequency distributions of each are depicted in Figures 4.5 and 4.6 respectively. This observation also translates to the Spearman's rho tests where informal planning consistently rated higher on average across a range of factors compared to formal planning. For example, the Spearman's rho test results for the importance of informal planning against the importance of providing innovative products and services to customers are: rho (100) = 0.59, $p < 0.01$; Effect size $rho^2 = 0.35$, a large effect size. Alternatively, the results for informal planning are: rho (100) = 0.52, $p < 0.01$; Effect size $rho^2 = .27$, at the lower

end of a large effect size. A summary of the Spearman's rho tests are presented in a correlation matrix in Table 4.10. Next, details concerning the importance of customer feedback and customer complaints are discussed.

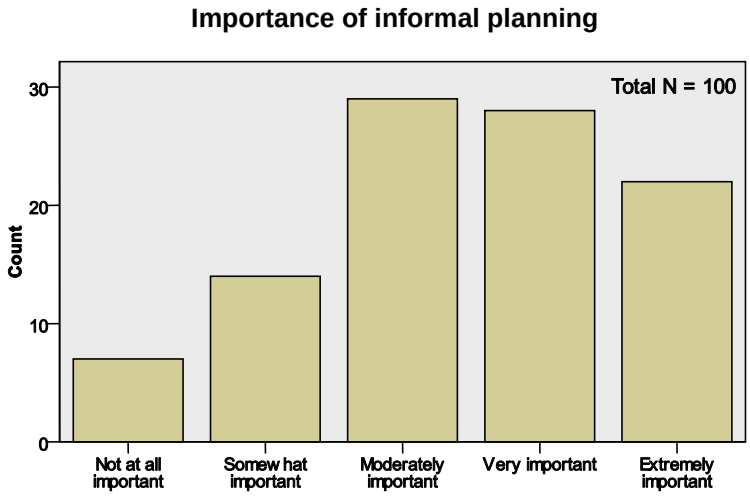


Figure 4.5 **Frequency of importance of informal planning for innovation activities**

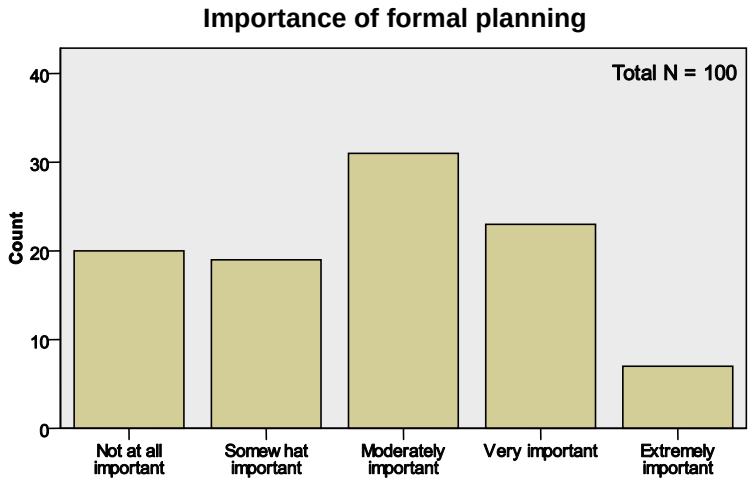


Figure 4.6 **Frequency of importance of formal planning for innovation activities**

Table 4.10 **Spearman's rho test summary correlation matrix**

Spearman's rho test		Imp of Innov	Imp of plan new goods/serv	Imp of Collab	Imp of good emp	Imp of informal plan	Imp of formal plan	Imp of innov prod/serv	Imp of cust feedback	Imp of cust complaint
Importance of Innovation	Correlation Coefficient	1.000	.375**	.316**	.047	.406**	.273**	.473**	.211*	.306**
	Sig. (2-tailed)	.	.000	.001	.643	.000	.006	.000	.035	.002
Imp of planning new goods/services	Correlation Coefficient	.375**	1.000	.211*	.302**	.449**	.365**	.438**	.120	.294**
	Sig. (2-tailed)	.000	.	.035	.002	.000	.000	.000	.235	.003
Importance of Collaboration	Correlation Coefficient	.316**	.211*	1.000	.093	.279**	.242*	.280**	.259**	.189
	Sig. (2-tailed)	.001	.035	.	.355	.005	.015	.005	.009	.060
Importance of good employees	Correlation Coefficient	.047	.302**	.093	1.000	.431**	.303**	.364**	.204*	.340**
	Sig. (2-tailed)	.643	.002	.355	.	.000	.002	.000	.042	.001
Importance of informal planning	Correlation Coefficient	.406**	.449**	.279**	.431**	1.000	**.691****	**.587****	.288**	.305**
	Sig. (2-tailed)	.000	.000	.005	.000	.	.000	.000	.004	.002
Importance of formal planning	Correlation Coefficient	.273**	.365**	.242*	.303**	.691**	1.000	**.516****	.166	.340**
	Sig. (2-tailed)	.006	.000	.015	.002	.000	.	.000	.098	.001
Importance of innovative products/services	Correlation Coefficient	.473**	.438**	.280**	.364**	.587**	.516**	1.000	.332**	.380**
	Sig. (2-tailed)	.000	.000	.005	.000	.000	.000	.	.001	.000
Importance of customer feedback	Correlation Coefficient	.211*	.120	.259**	.204*	.288**	.166	.332**	1.000	.492**
	Sig. (2-tailed)	.035	.235	.009	.042	.004	.098	.001	.	.000
Importance of customer complaint	Correlation Coefficient	.306**	.294**	.189	.340**	.305**	.340**	.380**	.492**	1.000
	Sig. (2-tailed)	.002	.003	.060	.001	.002	.001	.000	.000	.

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

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

Another important innovation process driver which helps build innovative capabilities is customer feedback. Indeed, customer feedback comes in two forms, both positive and negative; hence, the importance of customer complaints was also obtained from the respondents, the results of which are shown in Figures 4.7 and 4.8. What is interesting about these results is that even though there are visible differences represented in the graphs, the Spearman's rho test yielded an identical outcome when tested against each other. For instance, the Spearman's rho test results for each are: rho (100) = 0.49; $p < 0.01$; Effect size $rho^2 = 0.24$, just below a large effect size.

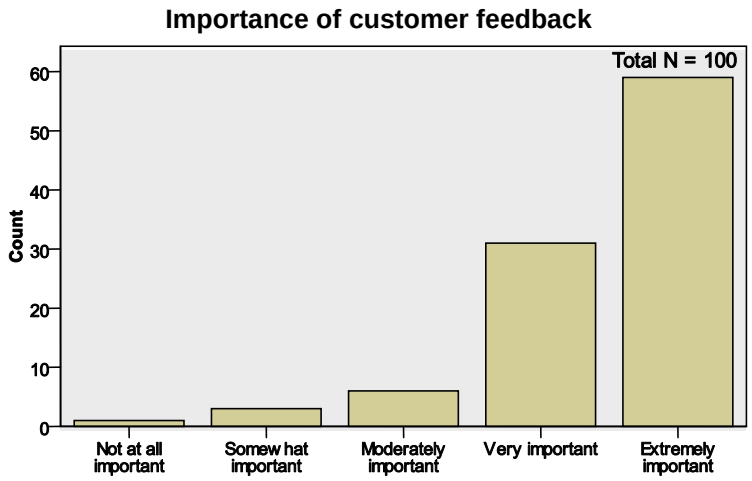


Figure 4.7 **Frequency of the importance of customer feedback**

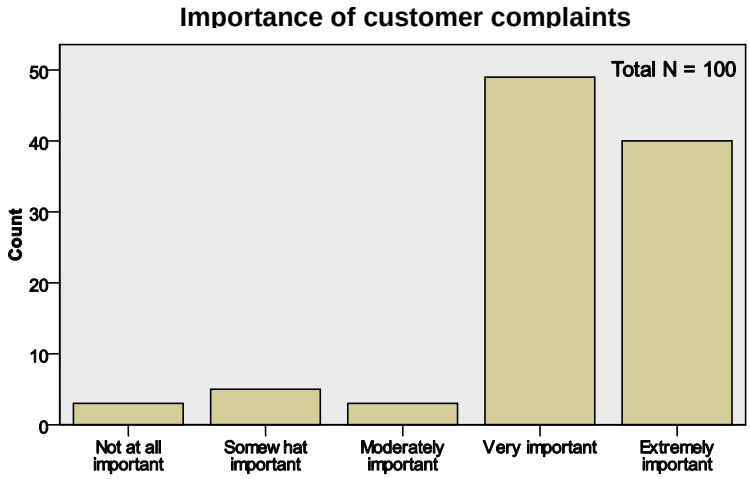


Figure 4.8 **Frequency of the importance of customer complaints**

In brief, a range of innovation process factors identified in the research literature such as planning, collaboration and customer feedback have shown medium to large measures of association with corresponding effect size. Next, a summary of business practices is discussed.

4.2.2 Summary of business practices

This section examines a range of innovation process drivers known to contribute to the building of innovative capabilities and innovation outputs. The drivers examined include: (a) the reasons for introducing innovations; (b) activities pursuant of innovative capabilities; (c) the introduction of new or significantly improved goods and services, both over a three- and one-year timeframe; (d) human resource management practices;

(e) adoption rate timeframes for new products and services, and for ideas and knowledge; and lastly, (f) collaboration activities and the entities collaborated with. These drivers are only several of the factors that contribute to building a business's innovative capabilities. For example, Dodgson and Hinze (2001) assert businesses proactively seek out technologies to gain future competitive advantage, which may include such activities ranging from 'attending conferences and exhibitions to industrial espionage' (p. 19). One point of interest for this thesis is what external forces encouraged businesses to engage in innovation activities, discussed next.

Innovation is ubiquitous as a means to attain competitive advantage, but what are the other reasons that compel a business to engage in innovation? Thus, Table 4.11 presents an insight into some of the other reasons why businesses engage in innovation, with the majority attributed to external forces. For example, the main reason cited by 60.2 per cent of the sample was decreasing sales revenue, followed by increased overhead costs with 59 per cent. New competitors were the next major factor with 43.4 per cent, while changes in government regulations and industry compliance each accounted for over a third. Interestingly, a requirement for extra finance was cited by just over a quarter as an important reason; whereas, only 8.4 per cent thought high staff turnover had a major impact. It is important to note, however, that many of the respondents were quick to point out that no amount of innovation would help improve a business that had not got the fundamentals right from the outset: the delivery of excellent customer service. Indeed, this comment was mentioned continuously throughout the interviews. Additionally, many respondents expressed concern at the increasing levels of industry and government regulation acting to elevate compliance costs, particularly in terms of the administration time required to address such compliance issues. In brief, declining revenue and increased competition lead to businesses engaging in more innovative activities, examples of which are discussed next.

Table 4.11 **Business conditions which drive innovation engagement**

Business conditions for the introduction of innovation	Responses		Percentage of Cases (N=83)
	N	Percentage	
Decreasing sales revenue	50	19.2%	60.2%
New competitors	36	13.8%	43.4%
High staff turnover	7	2.7%	8.4%
Requirement for extra finance	21	8.0%	25.3%
Increased overhead costs	49	18.8%	59.0%
Decrease in available vital resources	7	2.7%	8.4%
Decrease in available key suppliers	10	3.8%	12.0%
Changed external operating environment	22	8.4%	26.5%
Changes in government regulations	30	11.5%	36.1%
Changed industry compliance	29	11.1%	34.9%
Total	261	100.0%	314.5%

Activities that drive innovation process were identified during the literature review, with many acknowledged as helping businesses build on their innovative capabilities. Thus, respondents were asked which of these activities, listed in Table 4.12, they had undertaken during the previous 12 months of operation. The two most cited activities undertaken were the purchase of new machinery or equipment (77.9 per cent); and regular scanning of the external environment for new ideas, products, services or processes (66.3 per cent). Other activities undertaken include specialised training courses (49.5 per cent), introducing new marketing or promotional campaigns (41.1 per cent) and introducing new management techniques (40.0 per cent). These activities are consistent with the ABS report that 69 per cent of innovation expenditure is non-R&D related (Trewin & Paterson, 2006); albeit, R&D activities were undertaken in varying degrees, discussed next.

Intellectual protection low In contrast to the activities above, the least undertaken activities were the registration of patents or intellectual property protection (IPP) (2.1 per cent) and the purchase of external R&D information (6.3 per cent). Patents and IPP are considered as innovation outputs (Jensen & Webster, 2004); therefore, their registration does not actually constitute an innovation activity – it is more an administrative activity. Nonetheless, over 30 per cent of the sample did engage in other R&D focused activities such as R&D of new markets (31.6 per cent), and in-house product R&D (30.5 per cent). Many of the activities listed involve some form of R&D activity, such as the research and development of a new marketing campaign for

instance; although, many respondents did not equate such activity as constituting innovation. According to the ABS '...although innovation is an important distinguishing feature of our society, it has been poorly misunderstood' (Trewin & Paterson, 2006, p. 3).

Table 4.12 **Innovation process activities undertaken in previous 12 months**

Activities undertaken in 12 months	Responses		Percentage of Cases (N=95)
	N	Percentage	
Purchase new machinery/equipment	74	14.5%	77.9%
Purchase licensing/manufacture rights	10	2.0%	10.5%
Form external R&D partnership	9	1.8%	9.5%
Register patent or Intellectual Property Protection	2	0.4%	2.1%
Undertake specialised training course	47	9.2%	49.5%
Introduce new marketing/promotion campaign	39	7.6%	41.1%
R&D of new markets	30	5.9%	31.6%
Product R&D in-house	29	5.7%	30.5%
Market & customer research in-house	27	5.3%	28.4%
Purchase external R&D information	6	1.2%	6.3%
Develop and implement new business strategy	31	6.1%	32.6%
Introduce new management techniques	38	7.4%	40.0%
Significantly change business structure	23	4.5%	24.2%
Significantly change marketing strategy	26	5.1%	27.4%
Introduce new stock control methods	31	6.1%	32.6%
Introduce or improve information sharing	26	5.1%	27.4%
Regularly scan external environment	63	12.3%	66.3%
Total	511	100.0%	537.9%

Consequently, a number of respondents asked for clarification on the phrase R&D, and how it related to innovation. For example, several respondents believed R&D was associated with scientific or academic research, and were delighted when informed it could simply be sourcing an idea from the Internet and adapting it to suit their own business. In brief, the high levels of engagement in the listed innovation process activities indicates many small businesses continually strive to build on their levels of innovative capabilities. Next, the introduction of new or significantly improved goods and services is discussed.

Introductions and improvements drive innovation Another acknowledged driver of innovation involves the introduction of new or significantly improved goods or services. Such goods and services, listed in Table 4.13, can form the basis for innovation process activities pursuant to innovation outputs; alternatively, they can by themselves be an innovation or lead to an increase in innovative capabilities. For

example, the establishment of a website for information and sales (3 Yrs – 38.8 per cent; 1 Yr – 30.2 per cent) is not only a new service for existing customers, but it also serves as a platform for developing new markets. Additionally, a website becomes the host for the introduction of a range of new services such as an after-hours communication channel, a customer feedback repository, or a way of tracking orders. Importantly, because the Internet has become such a ubiquitous part of modern business models it is often overlooked as being a form of innovation, discussed next.

A typical example of how a website can increase market reach is an electronic and communication equipment reseller business in Charters Towers. When asked if he considered his business innovative, he adamantly replied: 'No, it's not about innovation, it's simply about providing excellent customer service'. However, after setting up a website to sell and service UHF radio equipment, the business now sells specialist communication radios to the Antarctic Exploration Division, simply because they provide excellent after sales service in a specialised field. The owner then added they had just quoted on supplying UHF radios to the Ararat taxi service, situated in the Wimmera region of Victoria. What is interesting about this anecdote is the respondent maintained the website was not an innovation, and that it was their commitment to high levels of customer service, and the specialisation in niche products, that had kept the business running successfully for over 25 years. Generally, the introduction of new, or improved, goods and services listed in Table 4.13 facilitated the overall improvement of customer service experiences such as electronic payment and billing systems, discussed next.

Table 4.13 **Introduction of new or significantly improved goods and services**

Introduction of new or significantly improved goods and services in observation period	**3 Year** Responses		Percentage of Cases (N=80)	**1 Year** Responses		Percentage Of Cases (N=63)
	N	Percentage		N	Percentage	
Environmentally friendly manufacturing processes	9	3.4%	11.2%	2	2.1%	3.2%
Use of environmentally friendly manufacturing materials	16	6.0%	20.0%	4	4.2%	6.3%
Introduce smart card/loyalty program	7	2.6%	8.8%	4	4.2%	6.3%
Use recycled paper/materials	**26**	**9.8%**	**32.5%**	**8**	**8.4%**	**12.7%**
Develop flexible customer service program	22	8.3%	27.5%	4	4.2%	6.3%
Purchase GPS for vehicles	5	1.9%	6.2%	3	3.2%	4.8%
Introduce new multimedia applications	15	5.7%	18.8%	5	5.3%	7.9%
Introduce environmentally friendly cleaning products	21	7.9%	26.2%	9	9.5%	14.3%
Provide extended/customised warranty on goods	8	3.0%	10.0%	3	3.2%	4.8%
Introduce pick-up/delivery services	17	6.4%	21.2%	2	2.1%	3.2%
Establish website for information/sales	**31**	**11.7%**	**38.8%**	**19**	**20.0%**	**30.2%**
Combine existing services into new service package	19	7.2%	23.8%	8	8.4%	12.7%
Install electronic clearing system	2	0.8%	2.5%	1	1.1%	1.6%
Provide new/improved insurance cover	14	5.3%	17.5%	4	4.2%	6.3%
Introduce automated customer enquiry system	3	1.1%	3.8%	1	1.1%	1.6%
Introduce electronic payment/billing system	**23**	**8.7%**	**28.8%**	**14**	**14.7%**	**22.2%**
Offer obsolete product recycling service	5	1.9%	6.2%	2	2.1%	3.2%
Offer free advisory service	22	8.3%	27.5%	2	2.1%	3.2%
Total	265	100.0%	331.2%	95	100.0%	150.8%

Customer service and cost containment Many of the new or improved goods and services introduced during the two observation periods aimed to improve customer service experiences or obtain greater cost efficiencies. For example, the introduction of electronic payment systems (3 Yrs – 28.8 per cent; 1 Yr – 22.2 per cent) directly improved the customer service experience, while also improving the cost efficiencies of the transaction process. Firstly, it meant the customer no longer needed to have the required cash on hand to complete the purchase, nor did they have to apply for a credit facility with the business. Secondly, the business benefited by receiving payment by the next day, thus improving their cash flow; in addition to reducing the administrative processes associated with managing credit accounts. Furthermore, the use of recycled paper and materials (3 Yrs – 32.5 per cent; 1 Yr – 12.7 per cent) has benefits for both the business and the environment. Recycling benefits the business by lowering operating costs; whereas, the environment benefits by reducing landfill and providing alternative supplemental sources of raw materials. The important point linking the introduction of new or significantly improved goods and services in Table 4.13 is the majority are improved incrementally following their introduction, discussed next.

A common link between many of the goods and services in Table 4.13 is the incremental improvements made following their introduction. For example, Trewin and Patterson (2006) report that Australia is similar to other countries in terms of a business's propensity for adopting and adapting innovations originally developed elsewhere. The vast majority of the goods and services in Table 4.13 would be defined as being new to the business itself, but not new to the region or even the country. Thus, the majority of these goods and services would have been introduced incrementally to accommodate employee learning curves, reallocation of resources and fine-tuning adaptation to integrate them into the existing business system. Indeed, 'this kind of innovation is precisely how innovation translates itself into productivity gains' (Trewin & Paterson, 2006, p. 21). In brief, the introduction of new or significantly improved goods and services aims to enhance the customer service experience, in addition to reducing the business's operating costs while improving productivity gains over time. Next, the important role human resource management plays in innovation is discussed.

Good staff essential One interesting finding is how respondents ranked the importance of having good staff to the success of their business. An issue intrinsically linked to human resource management practices, it was measured using a five-point Likert scale; whereby, 98 per cent of respondents believed having good staff was very to extremely important to the success of their business. Looking after staff through the application of various human resources management practices, listed in Table 4.14, is deemed an important factor for contributing toward sustainable business success. Moreover, the importance of good employees is also acknowledged as a significant factor for businesses that pursue an innovation strategy (Edelman, et al., 2002; Mankelow, 2008). For example, the most frequent HR practice used – 82.9 per cent – was flexible hours and/or job rotation. This finding is supported by Mankelow's research who reported eight out of ten respondents deemed the most common HR priority was 'flexible hours and conditions' (p. 2177). Interestingly, certain disparities emerged between the actual HR practices implemented and respondents' perceptions concerning the importance of particular HR practices such as staff training, discussed next.

Table 4.14 **HRM practices engagement frequencies**

HRM practices frequencies	Responses		Percentage of Cases (N=76)
	N	Percentage	
Human resources & recruitment plans	3	0.7%	3.9%
Formal employee induction procedures	27	6.1%	35.5%
Formal job analysis procedures	11	2.5%	14.5%
Formal job design description	17	3.9%	22.4%
Regular staff performance appraisal	23	5.2%	30.3%
Employee training & development program	31	7.0%	40.8%
Formal Industrial Relations procedures	5	1.1%	6.6%
Formal Occupational Health &Safety procedures	26	5.9%	34.2%
Equal Employment Opportunity policy	16	3.6%	21.1%
Pay above industry wages	52	11.8%	68.4%
Bonus reward/incentive payments	41	9.3%	53.9%
Flexible work-hours and/or job rotation	63	14.3%	82.9%
Open-book/open-door communication policy	53	12.0%	69.7%
Employee empowerment procedures	32	7.3%	42.1%
Regular staff feedback meetings	40	9.1%	52.6%
Total	440	100.0%	578.9%

Congruent with the research literature findings, this sample showed a disparity between the importance of certain HR practices compared to those they actually implemented. For example, employee empowerment procedures were implemented by only 42.1 per cent; whereas, 74 per cent of respondents believed it to be very to extremely important. Employee training and development programs were implemented by 40.8 per cent; whereas, 69 per cent of respondents rated continual staff learning as being very to extremely important. The benefits attributed to employee training include improved business efficiency and productivity, increased profitability and greater staff loyalty, according to Mankelow (2008). However, as was the case with this thesis concerning respondents' perceptions compared to actual HR practices, Mankelow further postulated the 'existence of a credibility gap between stated priority and practice' (p. 2179). In brief, the importance of good staff is crucial for sustainable business success, and in particular for helping build innovative capabilities; thus, looking after staff through the implementation of good HR practices is essential. Next, the importance of collaboration in building innovative capabilities is discussed.

Collaboration importance mixed There is a substantial amount of innovation research devoted to the role collaboration plays in driving innovation process activities and subsequent outputs. For example, Hyland and Beckett (2005) argue engaging in collaboration allows businesses 'to achieve outcomes that they could not achieve on

their own' (p. 339). The benefits of collaboration are not constrained simply to the attainment of strategic goals, however, but may include the learning of new skills or ways of doing things, and the acquisition of new knowledge. Nevertheless, Table 4.15 demonstrates that only 40 per cent of the sample engaged in some form of collaboration activity; albeit, some respondents participated in multiple collaboration activities. The most frequent collaboration activity was the formation of a marketing or distribution alliance undertaken by 50 per cent of the collaborating respondents, but which translates to only one-fifth of the total sample. This result is consistent with how respondents perceived the overall importance of collaboration in helping build innovative capabilities, with only 37 per cent rating it as very to extremely important; while 34 per cent rated it as only moderately important. Those who engaged in some form of collaboration activity were asked which activities were most successful, discussed next.

Table 4.15 **Engagement in collaboration activities**

Collaboration activities frequencies	Responses		Percentage of Cases (N=40)
	N	Percentage	
Formed marketing/distribution alliance	20	31.7%	50.0%
Formed manufacturing partnership	8	12.7%	20.0%
Participated in joint R&D	9	14.3%	22.5%
Formed joint venture outside industry	5	7.9%	12.5%
Undertook licensing agreement	6	9.5%	15.0%
Other collaboration/alliance	15	23.8%	37.5%
Total	63	100.0%	157.5%

There are 40 respondents who engaged in some form of collaboration activity, the most successful of which was the formation of a marketing or distribution alliance. For example, Figure 4.9 shows that of the 20 respondents who collaborated in a marketing or distribution alliance, 16 of those rated the activity as being successful. In contrast, of the nine respondents who participated in a joint R&D collaboration, only three of those rated the collaborative activity to be successful. Finally, five respondents engaged in a joint venture outside of their industry; whereby, only one rated this collaboration activity to be a success. Next, the types of organisations collaborated with is discussed.

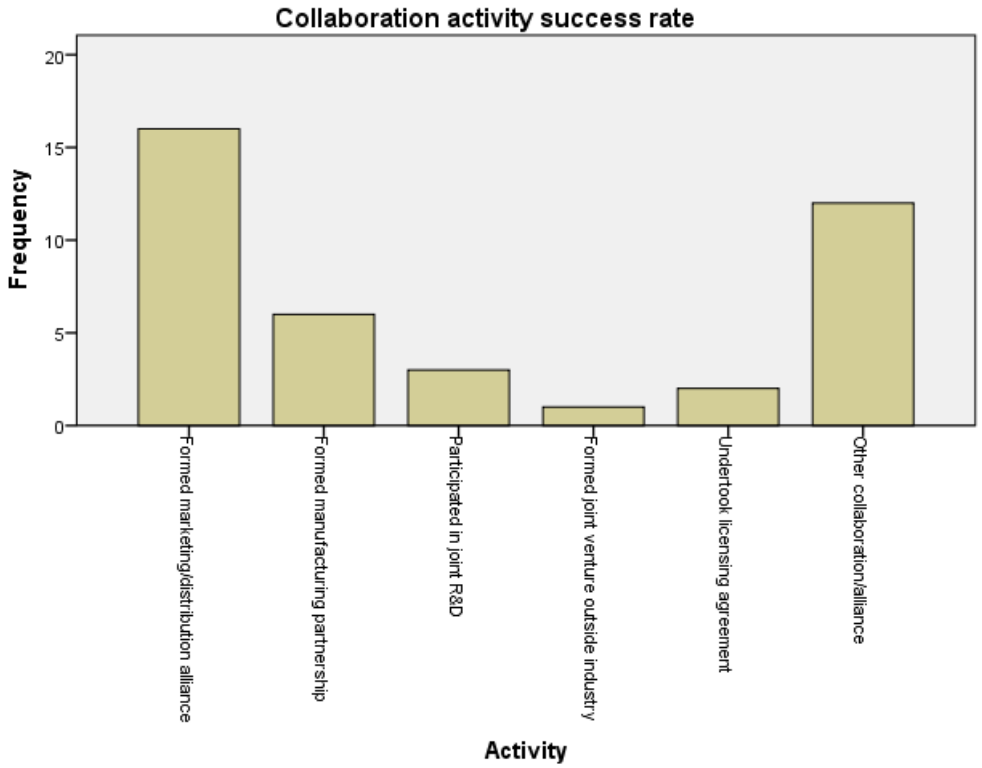


Figure 4.9 **Frequency of collaboration activity success rates**

Multiple collaborative engagements The interesting point concerning collaboration is that those businesses that engaged in collaboration did so with multiple partners. For example, Table 4.16 presents the results of the different types of collaboration partnerships formed by the 40 businesses that engaged in some form of collaborative activity. The results show a total of 93 collaborative partnerships were formed during the 12 month observation period, indicating that the businesses engaged in collaboration did so with more than one partner. Consistent with the findings from the research literature, the majority of collaborative partnerships (65 per cent) involved competitors or businesses within the same industry.

Table 4.16 **The types of collaboration partnership involved**

Collaboration partnership frequencies	Responses		Percentage of Cases (N=40)
	N	Percentage	
Member of state/national industry group	11	11.8%	27.5%
Suppliers of raw materials/equip/components	11	11.8%	27.5%
Existing client/old customer	19	20.4%	47.5%
Competitors/business in same industry	26	28.0%	65.0%
Business/supplier in different industry	10	10.8%	25.0%
Developers/industry advisers/consultant	6	6.5%	15.0%
University or TAFE college	5	5.4%	12.5%
Independent non-profit research org	1	1.1%	2.5%
Other joint venture orgs	4	4.3%	10.0%
Total	93	100.0%	232.5%

Collaborating with competitors within the same industry, a construct termed co-opetition, has recently emerged within the business grey literature (Dent, 2011). Albeit, the co-opetition construct has been an academic research topic for at least a decade (Gnyawali & Park, 2009). The next most frequent partnership involved existing clients or customers with 47.5 per cent, followed by industry groups and suppliers both with 27.5 per cent. Again, these results are consistent with the research literature; for example, whereby 'the importance of suppliers and customers to the innovation process is well known' (Dodgson & Hinze, 2001, p. 12). Next, how respondents rated the success of these partnerships is discussed.

Collaborative uncertainty The level of perceived beneficial success of businesses engaged in collaborative partnerships proved to be somewhat mixed compared to the results of collaboration activities. For example, Figure 4.10 shows that only 11 of the 26 businesses involved in a collaborative partnership with competitors or businesses within the same industry, and four of the 19 collaborating with existing clients or customers, rated it as a beneficial success. Alternatively, those businesses that engaged with industry groups or suppliers were rated to be beneficially successful by eight and seven respondents respectively. There could be a number of reasons for these differences, with one particular reason being similarly repeated by several respondents from the sample group. The reason came from the CEO of an SME disability services provider, who said their organisation was reluctant to collaborate with other similar organisations for fear of losing control of their intellectual property that gave them a competitive advantage. Indeed, Hyland and Beckett (2005) acknowledge this point as an important issue when they discuss trust as an integral component in the establishment of

collaborative partnerships. In brief, collaborative activities and partnerships can bring many benefits to the businesses involved; however, these findings indicate that the majority of small businesses are still reluctant to become engaged in collaboration. Next, the adoption rate timeframes of products, processes, ideas and knowledge is discussed.

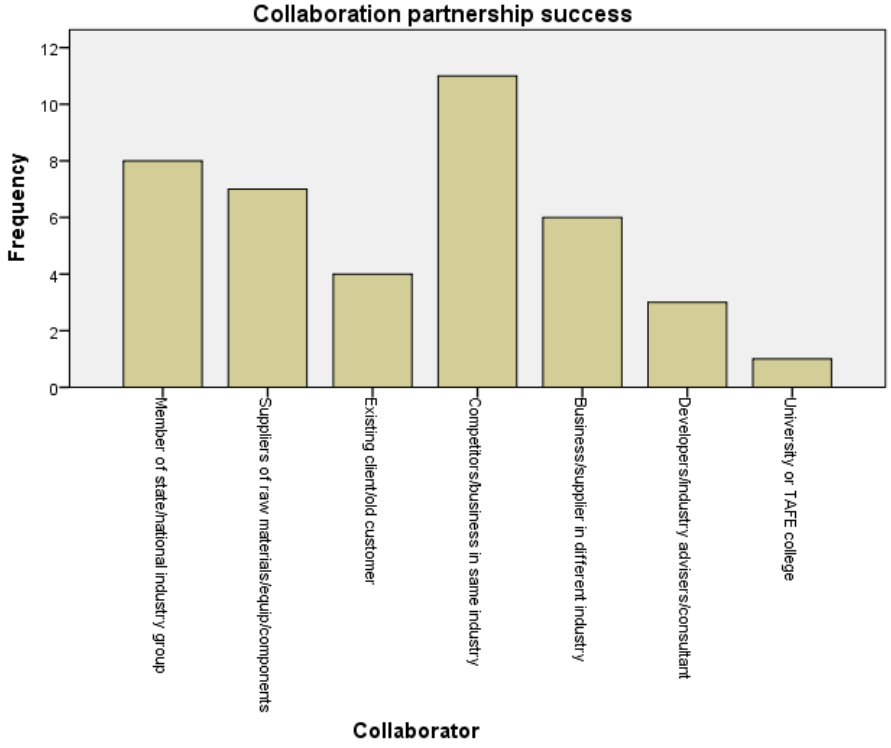


Figure 4.10 **Frequency of collaborative partnership success rates**

Potentially one of the most significant findings from this research concerns the adoption rate timeframes for the categories of products/processes/services and ideas/knowledge. The results of these adoption rate timeframes are presented in Figures 4.11 and 4.12. The reason these findings are significant is because they demonstrate the majority of small businesses within the sample have the capacity to quickly assess and integrate new products, processes and services, in addition to new ideas and knowledge, into their existing business operations. Further details of the statistical significance of these findings are discussed in Section 4.3; whereas, the discussion here serves to introduce them by acknowledging their importance. For example, Figure 4.11 shows that almost three-quarters of the sample (74 per cent) adopt new products/processes/services within a two-month timeframe. Furthermore, when it comes to adopting new ideas/knowledge into the business this percentage rises to 83 per cent within the same timeframe,

increasing to 98 per cent within a six-month timeframe. The reason these results are significant needs to be considered in the context of Rogers' (2003) Five Categories of Innovators, discussed next.

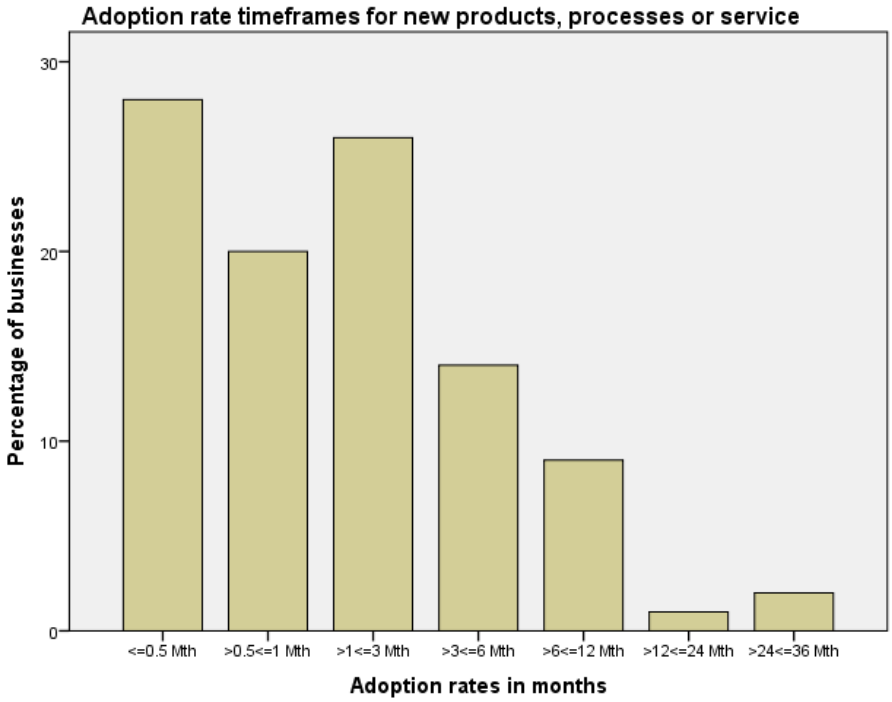


Figure 4.11 **Adoption rate timeframes for new products/processes/services**

Early adoption spurs innovation As a result of research into the diffusion of innovation, Rogers (2003) devised a construct for categorising innovation adopters based on the criterion of innovativeness. For example, Rogers classified the level of innovativeness of adopters into the following five categories: (1) innovators at 2.5 per cent; (2) early adopters at 13.5 per cent; (3) early majority at 34 per cent; (4) late majority at 34 per cent; and (5) laggards at 16 per cent. According to Rogers, the level of 'innovativeness is a relative dimension, in that an individual has more or less of this variable than others in a system' (2003, p. 280). Hence, a business or individual that consistently adopts new products, ideas or knowledge within a relatively short time period is considered to have high levels of innovativeness. The adoption rate of innovation ordinarily follows a normal bell curve distribution; whereby, Rogers used the statistical mean and standard deviation to segment the adopters into the five categories. Thus, by applying Rogers' adoption categories to the results of this thesis the significance of these findings become clear, discussed next.

The reason these two adoption rate timeframes are considered significant is because they coincide with Rogers' categories of innovators and early adopters. By transposing a 12-month adoption timeframe to Rogers' distribution bell curve depicting the five categories of innovativeness, we can make the assumption the mean is adoption rate six months and the standard deviation is two months. By applying these assumptions to Rogers' model we can conclude that the majority of businesses in the sample fall to the left of minus 2 standard deviations to the mean adoption rate of six months. Therefore, a substantive conclusion can be made the majority of the businesses interviewed are categorised as innovators or early adopters based on Rogers' classification categories. In brief, the two separate adoption rate timeframes are indicative of high levels of innovativeness for a majority of businesses within the sample. Next, the results from the multivariate analysis techniques applied are discussed.

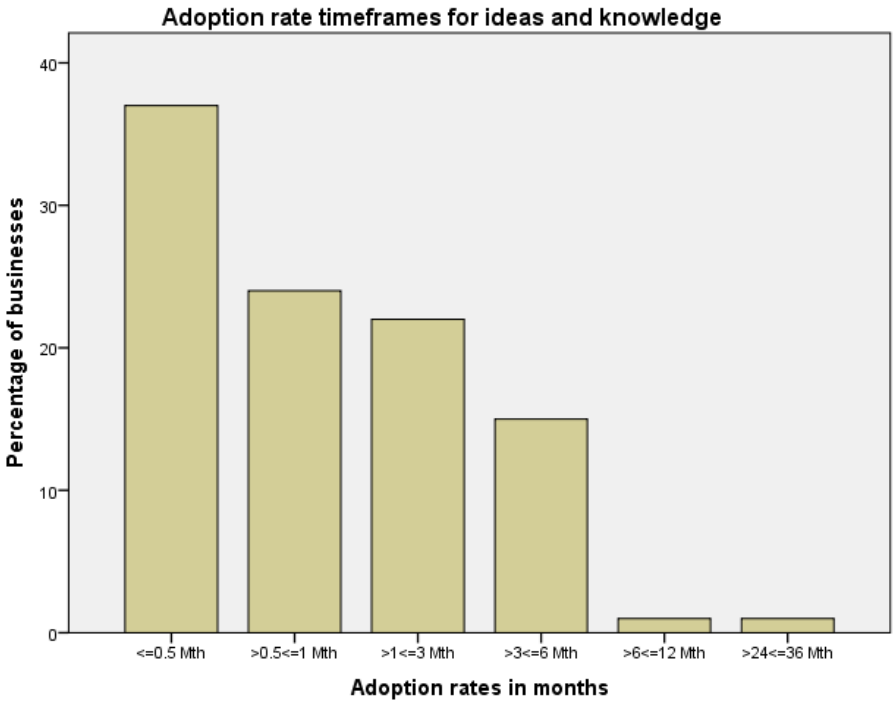


Figure 4.12 **Adoption rate timeframes for new ideas/knowledge**

4.3 RESULTS FROM NONPARAMETRIC TESTING

This section discusses the results obtained from the application of multivariate analysis techniques, the majority of which are nonparametric tests. The reason for applying nonparametric tests is because the frequency tables and subsequent graphs indicate the majority of the data does not assume normality of distribution, nor homogeneity of

variance as illustrated in Figures 4.11 and 4.12. Additionally, much of the primary data was either nominal data in the form of categories, or ordinal data in the form of ranks obtained through the use of Likert scales. Only the tests with statistically meaningful results, or those that showed strong measures of association, are presented here; whereas, those with less meaningful results or moderate measures of association are presented in the Appendix section. The first set of nonparametric tests discussed includes Bivariate correlation tests obtained by applying Kendall's tau-b and Spearman's rank correlation tests. The second set of nonparametric tests used the Chi-square test for testing the null hypothesis of variables within one sample relatedness, or independence; whereas, the Chi-square approach tests for approximate goodness-of-fit to determine whether differences exist within the frequency of a given response category. Finally, two tests for measuring effect size were applied using Kendall's coefficient of concordance test (*W*) and Cohen's effect size index (*w*). However, a problem was encountered when applying the Chi-square goodness-of-fit test via contingency tables for the ordinal data, discussed next.

The process for obtaining a Chi-square goodness-of-fit test statistic is to construct a contingency table using the variables of interest. The majority of the variables of interest were ordinal data obtained using a 1 to 5 Likert scale to rank the level of importance of various activities, or to rank how regularly specific activities were undertaken. This resulted in a substantial number of rows or columns within the 5 x 5 contingency table having expected counts less than five; hence, the value in the Chi-square test output tables proved to be unreliable. Subsequently, treatment had to be applied to these tables by grouping the results for the purpose of achieving expected counts greater than five, resulting in a contingency table of 2 x 2. Such treatment meant the Chi-square test output value had greater reliability. The results summary of the chi-square test for relatedness or independence on variables of interest tested are presented in Table 4.17, discussed next.

Proactive routines build capabilities One set of questions asked respondents to rank how regularly they undertook certain activities known to drive innovation processes and build innovative capabilities. Using a 1 to 5 Likert scale, with 1 representing 'Not at all' and 5 representing 'All the time', Table 4.17 presents a summary based on the Chi-square test of relatedness obtained from contingency tables. Additionally, Table 4.18 presents Cohen's guidelines for measuring and interpreting the effect size of the value

obtained following a Chi-square test of goodness-of-fit. For example, the variables of actively seeking customer feedback and actively improving service delivery showed significant relatedness beyond the 0.05 level: χ^2 (1) = 16.56; $p < 0.005$. The Cohen's effect size index value (w) = 0.41 indicates a medium effect. The variables of introducing new marketing techniques and improve management processes also showed significant relatedness beyond the 0.05 level: χ^2 (1) = 14.59; $p < 0.005$ and (w) = 0.38. The substantive point concerning the range of variables listed in Table 4.17 is they are generally congruent with innovation process drivers identified in the research literature. For instance: encouraging and rewarding staff for new ideas; fostering a no-blame work environment; actively seeking customer feedback; and, planning for new products and services are all part of a systematic approach to driving innovation processes and developing innovative capabilities. Next, the results of the Chi-square tests for independence are discussed.

Table 4.17 **Summary of Chi-square test for variable relatedness**

Variables ***Ranks of how regularly innovation process activities are undertaken***	**Degrees of freedom** ***df***	**Estimated value of chi-square (χ^2)**	**Level of significance 95%** ***(p value)***	**Critical value of chi-square**	**Cohen's effect size index value (*w*)**
Encourage new ideas from staff AND Reward staff for new ideas	1	9.70	.05 (p=.000)	3.841	.34
Encourage new ideas from staff AND Foster no-blame work environment	1	9.72	.05 (p=.000)	3.841	.34
Encourage new ideas from staff AND Pay for or subsidise staff training	1	5.68	.05 (p=.000)	3.841	.26
Reward staff for new ideas AND Foster no-blame work environment	1	9.04	.05 (p=.000)	3.841	.33
Actively seek customer feedback AND Actively improve service delivery	1	16.56	.05 (p=.000)	3.841	.41
Actively seek customer feedback AND Act on customer feedback	1	9.67	.05 (p=.000)	3.841	.31
Actively improve service delivery AND Introduce new marketing techniques	1	3.86	.05 (p=.002)	3.841	.20
Act on customer feedback AND Reward staff for new ideas	1	8.38	.05 (p=.000)	3.841	.29
Plan for new products or services AND Introduce new marketing techniques	1	6.00	.05 (p=.003)	3.841	.24
Plan for new products or services AND Read research/industry/trade publications	1	4.62	.05 (p=.009)	3.841	.21
Introduce new products AND Importance of planning for new goods/services	1	6.42	.05 (p=.000)	3.841	.25
Introduce new marketing techniques AND Improve management processes	1	14.59	.05 (p=.004)	3.841	.38
Introduce new marketing techniques AND Trial new operational procedures	1	4.08	.05 (p=.001)	3.841	.20
Purchase new equipment/machinery AND Read research/industry/trade publications	1	4.39	.05 (p=.000)	3.841	.21

Table 4.18 **Cohen's guidelines for interpreting effect size of Chi-square test goodness-of-fit**

Value of *w*	**Size of effect**
$0.1 \leq w < 0.3$	**Small**
$0.3 \leq w < 0.5$	**Medium**
$w \geq 0.5$	**Large**
A value less than 0.1 is trivial. A value between 0.1 and 0.3 is a Small effect. A value between 0.3 and 0.5 is a Medium effect. A value of at least 0.5 is a Large effect.	

Sourced from Gray and Kinnear (2012, p. 419)

The next test applied was the Chi-square goodness-of-fit test used to ascertain if differences exist between respondents' perceptions towards innovation process drivers. As with the activities listed in Table 4.17, the questions asked used a five-point Likert scale to rank respondents' answers concerning the level of importance attributed to certain factors; or alternatively, their likelihood of engaging in certain activities. For example, Table 4.19 presents a summary from the outcome of these tests which included questions about: the importance of planning for new goods and services; the likelihood of the respondent undertaking further training; the importance of employee empowerment; and the importance of good employees to the success of the business. Additionally, two questions related to adoption rate timeframes are included in the table; one timeframe for the adoption rate of new products, processes or services, while the other represents the adoption rate for new ideas or knowledge. With a significance level of .05, each of the questions listed in Table 4.19 resulted in a rejection of the null hypothesis, indicating significant differences in the frequencies of the answers given. Next, the outcome of Bivariate correlation tests using Kendall's tau-b and Spearman's rho rank correlation test is discussed.

Table 4.19 **Chi-square goodness-of-fit tests for independence**

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The categories of **Importance of planning for new goods/services** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
2	The categories of **Importance of good employees to the success of the business** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
3	The categories of the **Likelihood for respondent undertaking further training** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
4	The categories of **Importance of respondent to engage in further learning** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
5	The categories of **Importance of employing higher education qualified staff** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
6	The categories of **Likelihood of paying for/provide flexible hours for training** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
7	The categories of **Importance of staff to engage in further learning** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
8	The categories of **Importance of paying for or subsidising training** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
9	The categories of **Importance of providing flexible hours for training** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
10	The categories of **Importance of employee empowerment** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
11	The categories of **Adoption rate timeframes for new ideas/knowledge** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
12	The categories of **Adoption rate timeframes for new products/processes/services** occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Testing for variable correlations There are a complement of Bivariate correlation tests used to ascertain measures of association between ordinal variables. The tests used for this thesis are Kendall's tau-b, Gamma and Spearman's rank correlation test. The results from a range of variables tested using Spearman's rank correlation test has already been presented in Table 4.10; whereby, the outputs concerned the rated level of importance for a range of innovation process drivers. The results presented in Table 4.20 are concerned with ratings of how regularly various innovation process activities are undertaken, which then drive and build innovative capabilities. Additionally, Table 4.21 highlights the effect size of the measure of association using the correlation coefficient. The variables that show the strongest measure of association are staff related, for example: encouraging new ideas from staff and rewarding staff for new ideas; encouraging new ideas from staff and fostering a no-blame work environment. Interestingly, spending on R&D and improving management processes had a relatively low measure of association in contrast to spending on R&D and introducing new marketing techniques.

Table 4.20 **Measures of association results of innovation process activities**

Variables ***Ranks of how regularly innovation process activities are undertaken***	Kendall's tau-b	Spearman's rank correlation	Gamma	Level of asymptotic significance	Spearman's rho^2 effect size
Encourage new ideas from staff AND Reward staff for new ideas	.623	.712	.728	.000	.51
Encourage new ideas from staff AND Foster no-blame work environment	.634	.717	.740	.000	.51
Encourage new ideas from staff AND Pay for or subsidise staff training	.524	.616	.623	.000	.38
Encourage new ideas from staff AND Improve management processes	.314	.370	.397	.000	.14
Reward staff for new ideas AND Foster no-blame work environment	.557	.642	.649	.000	.41
Foster no-blame work environment AND Pay for or subsidise staff training	.465	.554	.545	.000	.31
Actively seek customer feedback AND Actively improve service delivery	.439	.492	.577	.000	.24
Actively seek customer feedback AND Act on customer feedback	.269	.309	.370	.000	.09
Act on customer feedback AND Reward staff for new ideas	.333	.390	.438	.000	.15
Actively improve service delivery AND Introduce new marketing techniques	.301	.347	.412	.000	.12
Spend on R&D AND Introduce new marketing techniques	.396	.450	.525	.000	.20
Spend on R&D AND Improve management processes	.251	.288	.343	.003	.08
Plan for new products or services AND Introduce new marketing techniques	.330	.387	.424	.000	.15
Plan for new products or services AND Read research/industry/trade publications	.252	.302	.325	.002	.09
Introduce new marketing techniques AND Improve management processes	.307	.356	.395	.000	.13

Next, the measure of association between the perceived importance levels of various innovation process drivers is discussed.

Table 4.21 **Cohen's guidelines for classifying association strength, as measured by a correlation coefficient**

Absolute value of *r*	**r squared**	**Size of effect**
$0.10 \leq r < 0.30$	$0.01 \leq r^2 < 0.09$	**Small**
$0.30 \leq r < 0.50$	$0.09 \leq r^2 < 0.25$	**Medium**
$r \geq 0.50$	$r^2 \geq 0.25$	**Large**
A correlation less than 0.1 is TRIVIAL A correlation between 0.1 and 0.3 is SMALL. Between 1% and 8% of the variance is shared. A correlation between 0.3 and 0.5 is MEDIUM. Between 9% and 25% of the variance is shared. A correlation of 0.5 or greater is LARGE. At least 25% of the variance is shared.		

Sourced from Gray and Kinnear (2012, p. 209)

Of the range of innovation process drivers investigated, planning procedures was rated as the most important with a strong measure of association. For example, in Table 4.22 the importance of formal and informal planning procedures resulted in a Spearman's rho test of rho (100) = 0.678; p = < 0.005; rho^2 = 0.46, a large effect. According to Cohen's size of effect index in Table 4.22, this means at least 25 per cent of the variance between the two variables is shared. Another important measure of association came from the importance of having flexible hours for training and paying for, or subsidising, staff training resulted in rho (100) = 0.645; p = < 0.005; rho^2 = 0.42, a large effect. Not surprisingly, the importance of collaboration and the importance of informal planning procedures yielded only a moderate outcome of rho (100) = 0.279; p = 0.005; rho^2 = 0.08, a small effect; whereas, collaboration and formal planning produced an even smaller correlation coefficient. This result is consistent with the fact only 60 per cent of the sample engaged in some form of collaborative activity. Next, a summary of the statistical results is discussed.

Table 4.22 **Measures of association for importance of innovation process drivers**

Variables ***Ranks of importance between innovation process drivers***	**Kendall's tau-b**	**Spearman's rho**	**Gamma**	**Level of asymptotic significance**	**Spearman's rho^2 effect size**
Importance of formal planning AND Importance of informal planning	.587	.678	.735	.000	.46
Importance of innovative products & services AND Importance of informal planning	.509	.587	.662	.000	.35
Importance of innovative products/services AND Importance of formal planning	.403	.485	.536	.000	.24
Importance of customer feedback AND Importance of informal planning	.250	.288	.373	.004	.08
Importance of customer complaints AND Importance of informal planning	.273	.305	.386	.003	.09
Importance of continual learning AND Importance of staff continual learning	.400	.448	.563	.000	.20
Importance of employee empowerment AND Importance of innovative products & services	.284	.327	.461	.001	.12
Importance of flexible hours for training AND Importance of paying/subsidising training	.590	.645	.784	.000	.42
Importance of innovation AND Importance of planning for new goods/services	.333	.375	.472	.000	.14
Importance of innovation AND Importance of innovative products/services	.416	.473	.575	.000	.22
Importance of planning for new goods/services AND Importance of innovative products/services	.387	.438	.546	.000	.19
Importance of planning for new goods/services AND Importance of informal planning	.392	.449	.536	.000	.20
Importance of collaboration AND Importance of informal planning procedure	.235	.279	.302	.005	.08
Importance of collaboration AND Importance of formal planning	.194	.239	.251	.011	.06

The identified drivers In summary, the results of the multivariate analysis techniques applied were consistent with the overall findings from the innovation research literature. For example, the role of planning for innovation activities, and the introduction of new goods and services, is rated with high importance; albeit, informal planning procedures rated more highly than formal planning procedures. Moreover, the value of good employees to the success of the business is extremely important, as is the importance of training and continual learning for engendering employee empowerment. To further assist with these training measures the provision of flexible hours and paying for, or subsidising, staff training is also highly rated. Indeed, employees are a valuable source of ideas for building innovative capabilities, as are customers and suppliers. Regular scanning of external environments, in particular looking at competitors' websites and the reading of industry and trade journals, is another valuable source for ideas and new products or processes. Finally, the adoption rate timeframes for new products or processes, ideas and knowledge are demonstrative of the majority of businesses having high levels of innovative capabilities. Next, the results of the factor analysis procedure are discussed.

4.3.1 Results from factor analysis

As recommended by Hair et al. (1998), a range of different factor analysis procedures were undertaken to evaluate the one most suited to the data. Some of the different methods applied, for example, included: PAF analysis with Varimax, Quartimax and Oblimin rotations; PC analysis with Oblimin rotation and Kaiser Normalisation; and CATPCA – principal components analysis for categorical data; with differing outputs received. The results from this last procedure produced 10 dimension (component) factors with total variance coverage of 78.3 per cent and a Cronbach's alpha value of 0.987. However, the component loading matrix had multiple high loadings on the first dimension, with relatively small loadings on the other dimensions, in addition to numerous negative sign loadings; thereby, making clear interpretation of the dimensions difficult. Similarly, the principal component analysis with Oblimin rotation also produced a components score coefficient matrix with numerous negative sign loadings and multiple high loadings on the first factor; for example, one entire matrix column consisted solely of negative sign loadings. Subsequently, the most usable and interpretable output was derived through application of PC analysis with Varimax with Kaiser Normalisation rotation, discussed next.

Following the application of several factor analysis methods on the 23 variables being analysed, the most interpretable output was obtained using the PC analysis method. The data analysed involved 23 questions using a five-point Likert scale, with 1 representing "Not at all" and 5 representing "All the time", to ascertain how regularly respondents engaged in certain innovation process activities. Several questions related to human resource management processes, such as rewarding staff for new ideas; whereby, the 16 sole operators in the sample were unable to provide answers. Consequently, the raw data needed to be re-coded with a zero to replace the system missing values before the factor analysis methods could be run because 'by default, missing data are deleted listwise, resulting in the whole case being excluded from the analysis' (Coakes, et al., 2008, p. 133). With a sample size of 100 respondents that showed overall response normality, and with the ordinal range of 1–5 meaning there were no outliers, the data satisfied the basic assumption testing for application of factor analysis. Next, several additional test criteria for assessing the factorability of the variables is discussed.

Preliminary evaluation Several tests for assessing the factorability of the variables are applied, such as Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy. However, the first step in assessing the factorability of the data is a visual inspection of the correlation matrix to identify those variables which are statistically significant. For example, the generally accepted cut-off value for correlations is > 0.3; whereby, a majority of correlations below this value is indicative of non-factorability. Additionally, the anti-image correlation matrix in the PAF method, or the reproduced correlations matrix in the PC method, is also used to assess the sampling adequacy of each variable. With rotated values displayed on the diagonal of each correlation matrix, variables with a value < 0.5 should be excluded from the analysis according to Coakes et al. (2008). The values for this test ranged from 0.509 to 0.803, indicating all the variables could be retained. Furthermore, Bartlett's test of sphericity = 656.511; Sig. = 0.000 demonstrating significant relations exist among the variables, with the Kaiser–Meyer–Olkin measure of sampling adequacy = 0.655, where a value above 0.5 is deemed acceptable; thus, good factorability of the data is assumed. Next, the process involving the number of factors extracted is discussed.

There are a number of techniques available to assist with determining the number of factors extracted which are representative of the original variables. According to Hair et al. (1998), these techniques include: the latent root criterion; the a priori criterion; the

percentage of variance criterion; and lastly, the scree test criterion. For instance, the latent root criterion works on the basis that any individual factor must account for the variance of at least one single variable as determined by having an eigenvalue greater than 1. The a priori criterion is simply based on stating the number of factors to be extracted prior to undertaking the factor analysis. Similarly, the percentage of variance criteria is based on obtaining a pre-specified cumulative percentage of total variance coverage of the original variables to ensure a level of practical significance. The final technique, the scree test criteria, was applied here for determining the number of factors to extract. Presented in Figure 4.13, the scree plot is obtained by plotting the eigenvalues against the number of factors in their order of extraction; whereby, the factor cut-off point is determined by the levelling out of the resulting curve. These results are further confirmed in an output table by SPSS titled Total Variance Explained located in Appendix 5. This table also presents the initial eigenvalues, the percentage of total variance coverage for each factor, in addition to the cumulative percentage of the total variance coverage. Determining the number of factors to extract using the scree plot is discussed next.

Visual inspection The scree plot presented in Figure 4.13 is used for visually identifying an appropriate number of factors to extract (R. A. Johnson & Wichern, 2002). Importantly, all the factors contain a certain percentage of unique variance whereby, according to Hair et al., 'the proportion of unique variance is substantially higher in later than in earlier factors' (1998, p. 104). The number of factors to extract is indicated by the point at which the curve begins to approximate a horizontal line. Beyond this point at factor 8, where the eigenvalues fall below 1, the unique variance of each factor becomes proportionally larger making these later factors unacceptable for inclusion. This visual conclusion is further confirmed by the SPSS output Total Variance Explained (Appendix 5); which, in addition to displaying the actual eigenvalues, also indicates the eight new factors explain a cumulative total variance coverage of 65.9 per cent of the original variables. Hence, the percentage of total variance is deemed an acceptable level of coverage for the original 23 variables. Next, the steps involved in interpreting the eight factors from the rotated component matrix are discussed.

Several important issues must be considered when interpreting the factor's loadings obtained in the final rotated component matrix. For example, issues concerning the

practical and statistical significance of the factor loadings require due consideration according to Hair et al. (1998), as do the number of variables under examination; all of which have varying degrees of effect on the factor loadings interpretation. The actual interpretation process involves examination of the factor loadings in the component matrix; whereby, the loadings represent the levels of correlation existing between the original variables and their factors. Thus, in terms of practical significance, Hair et al. argue the general rule of thumb is that the greater the factor loading value, the greater their practical significance, discussed next.

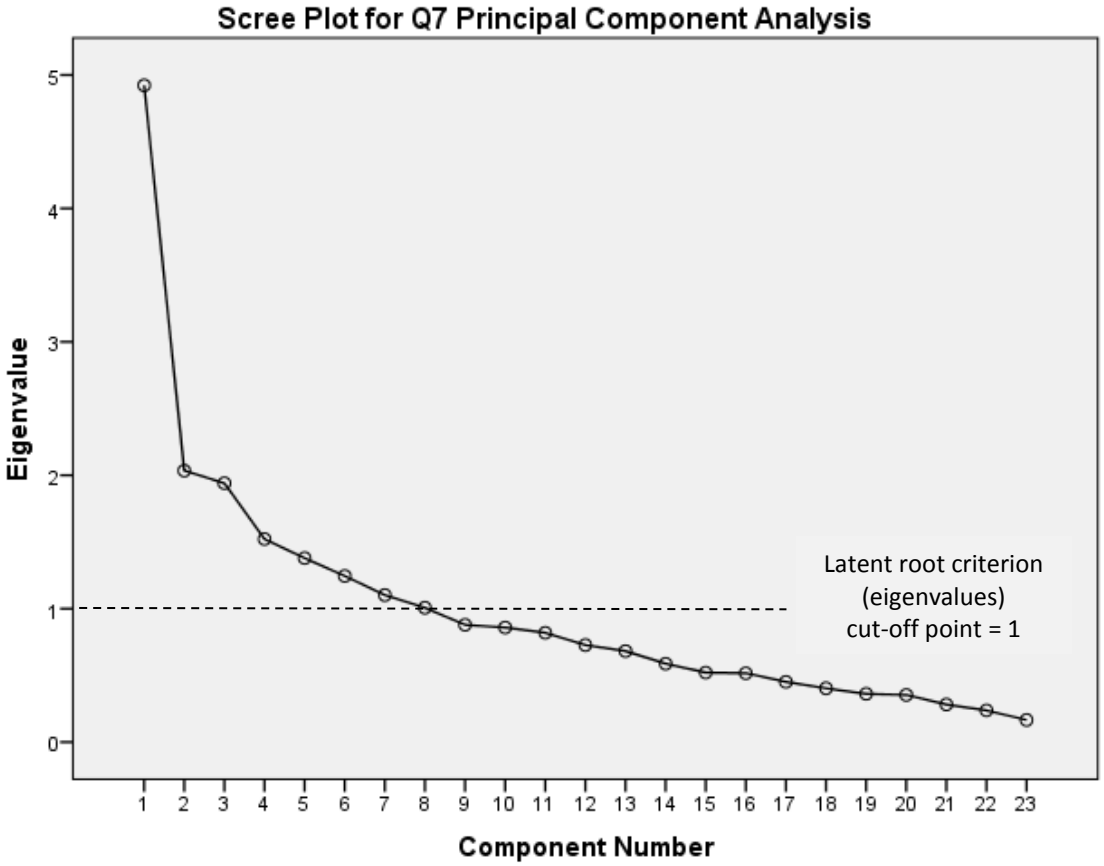


Figure 4.13 **Scree plot of eigenvalues used for determining factor extraction**

Assessing total variance For instance, factor loadings exceeding ±0.30 meet the minimum level of practical significance; but loadings exceeding ±0.50 are deemed to have high levels of practical significance. Additionally, by squaring the factor loading similar to Pearson's correlation R^2, the squared loading value represents the level of total variance accounted for by the factor of the original variable. Using the same values from above, a squared loading of 0.30 equates to approximately 10 per cent of the total variance explained; whereas, a loading of 0.50 equates to approximately 25 per cent of

the total variance explained by the factor. Incidentally, these general guidelines are only of practical importance for sample sizes over 100; however, they hold no real statistical significance, discussed next.

In terms of determining and interpreting the statistical significance of factor loadings, a method similar to that applied for assessing correlation coefficients can be used. Caution must be taken when interpreting the loadings, according to Hair et al. (1998), because generally the loadings have standard error values often considerably larger than normal correlation coefficient standard error values. Consequently, Hair et al. proposed basic guidelines, shown in Table 4.23, to provide direction in factor loading interpretation. Basically, the smaller the sample size being analysed, the higher the factor loading required for statistical significance. For example, as with the respondent sample size of 100 used for this thesis, a factor loading over 0.55 is considered statistically significant. Nevertheless, Hair et al. assert some smaller factor loadings may be considered significant during the interpretation process once additional factors are taken into consideration, such as their level of significance to the original variable in the correlation matrix. Next, the interpretation process of the factor matrix is discussed.

Table 4.23 **Guidelines for identifying significant factor loadings based on sample size**

Factor loading	Sample size needed for significance
.30	350
.35	250
.40	200
.45	150
.50	120
.55	100
.60	85
.65	70
.70	60
.75	50

Sourced from Hair et al. (1998, p. 112)

Interpreting factor relationships The process of interpreting the interrelationships between the newly derived factors and the original variables is quite complex. Starting with the first original variable and moving horizontally from left to right across the factor matrix, the objective is to identify the highest loading value for that variable with

any corresponding factor, which is then underlined. This process is repeated for each of the original variables until all have at least one high value loading underlined; remembering that in most instances, the lowest factor loading deemed significant is ±0.30. The ideal, according to Hair et al., is to have each original variable correlate with only one high factor loading which makes for easy interpretation. However, the values in the rotated component matrix in Table 4.24 show this is seldom the case, with a number of the original variables correlated to several moderate sized loadings. One would expect this to be the case on the basis of the original 23 variables being reduced to only eight factors. Further, in a situation where an original variable was not accounted for by a factor loading, assessment of communalities table was undertaken. For example, any variables with communalities less than 0.50 would be deemed to have insufficient explanation of the variance represented by the factor outcome for each variable. Thus, following examination of the communalities table, the values ranged from 0.509 to 0.803, indicating sufficient levels of variance explanation of all the original variables. Next, the final interpretation step of labelling the new factors is discussed.

Table 4.24 **The rotated component matrix**

Rotated Component Matrix

Original Activity Variables	Factor Components							
	1	2	3	4	5	6	7	8
1) Regularly introduce new products	.069	.125	.262	.192	.739	.043	-.032	-.001
2) Seek out what competitors are doing	.066	-.020	.634	-.128	.347	-.051	.057	.187
3) Actively seek customer feedback	-.244	.809	.121	.098	.106	-.039	.156	.099
4) Actively improve service delivery	.168	.712	.392	-.030	-.021	.089	.014	-.166
5) Encourage new ideas from staff	.451	.042	.094	.648	.176	.135	-.213	-.041
6) Introduce what competitors are doing	-.079	.161	.642	.248	.084	.264	.113	-.021
7) Act on customer feedback	.142	.590	-.229	.147	.276	-.176	.009	.252
8) Reward staff and their ideas	.152	.360	.046	.564	.310	.137	-.175	-.010
9) Foster no-blame work environment	-.093	.014	.033	.877	-.059	.053	.124	.049
10) Maintain links with similar businesses	.125	.043	.051	.089	.010	.773	.162	.122
11) Spending on research and development	.027	.048	.149	-.027	.213	.145	.071	.835
12) Plan for new products/services	.384	.040	.564	.094	.097	-.114	.209	.251
13) Pay for and/or subsidise staff training	.387	-.160	.024	.297	-.035	.488	-.198	.132
14) Introduce new marketing techniques	.191	.229	.502	.112	-.064	.065	-.133	.545
15) Improve management processes	.516	.485	.008	-.025	-.028	.200	-.044	.325
16) Purchase new equipment/machinery	.727	.046	.331	-.005	.056	.110	.071	-.138
17) Trial new operational procedures	.350	.239	.383	-.205	.299	.415	-.230	.052
18) Attend industry conferences/seminars	.464	.081	-.081	.026	.184	.351	.327	.125
19) Form industry partnerships/alliances	.057	-.008	-.014	-.270	.050	.304	.710	-.031
20) Sponsor industry research	.125	.116	.193	.120	.010	-.067	.726	.030
21) Collaborate with suppliers	-.120	-.224	.177	.297	.453	.466	.218	-.149
22) Trial new distribution channels	.147	.111	.038	-.060	.708	.024	.088	.213
23) Research industry/trade publications	.603	-.126	-.069	.156	.202	.012	.341	.267

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.

The final step in interpreting the new factors involves assigning labels which are representative of the loadings attributed to the original variables. Thus, high loading

values from the original variables are deemed more important, and therefore, exert greater influence on the label assigned to represent the factor. For example, factor (2) in Table 4.24 has loading values of 0.809, 0.712 and 0.590 respectively related to the original variables of: (3) actively seek customer feedback; (4) actively improve service delivery; and (7) act on customer feedback. In this instance, the label 'customer engagement to improve service delivery' is assigned to this factor; whereby, variable (7) is homologous of variable (3) in terms of improving service delivery. Subsequently, the following labels are assigned to the eight new factors, with the numbers of the original variable listed in parenthesis.

Table 4.25 **New factors derived from original variables**

#	New Factor	Original #
1	Operational improvements via knowledge acquisition	15, 16, 18, 23
2	Customer engagement to improve service delivery	3, 4, 7
3	Plan for new products/services by imitating competitors	2, 6, 12
4	Nurturing of human capital environments	5, 8, 9, 13
5	Regularly trial new products and distribution channels	1, 22
6	Improve operational procedures through collaboration activities	10, 17, 21
7	Form industry partnerships through research sponsorship	19, 20
8	Conduct R&D on new marketing techniques	11, 14

Importantly, as Hair et al. pointed out, sometimes smaller loadings may be deemed significant when interpreting the factors once additional issues are taken into consideration, discussed next.

Getting it right Inspection of factor (4) in the component matrix reveals a loading value of 0.297, less than 0.30 cut-off point, even though other higher loadings are evident for that specific variable. For instance, the original variable (13) of pay for and/or subsidise staff training, actually had the highest loading of 0.488 corresponding with factor (6). However, it bore little similarity to the other three original variables that linked collaboration to suppliers and other businesses with the trialling of operational procedures. Inspection of the initial correlation matrix, which also presented one-tailed level of significance values, indicated greater levels of significance in the relationship with the human capital variables in factor (4) than with the variables making up factor (6). Furthermore, the same variables in factor (4) produced strong correlation coefficients in the Kendall's tau-b and Spearman's rho tests, in addition to the strong measures of association in the chi-square test for relatedness. Hence, by considering

these additional statistically significant outcomes from the previous tests, it was deemed appropriate to incorporate variable (13) into factor (4) nurturing of human capital environments.

In summary, the application of factor analysis on the 23 variables focused on innovation process activities produced a usable and significant output. Not only were the original 23 variables reduced by almost two-thirds, but the new factors were generally meaningful and consistent with innovation process drivers identified in the research literature. For example, factor (2) – customer engagement to improve service delivery – is a widely acknowledged and accepted process for making improvements to service delivery. Similarly, factor (3) plan for new products/services by imitating competitors specifically supports the important concept of adoption rates. The eight new factors, or variables, can now be integrated into future research projects on small business innovation; whereby, they provide a clear picture of the innovation process activities undertaken. In order to make all the analytical findings usable for the development of the thesis outputs, a summary of all the data analysis undertaken is discussed next.

4.4 SUMMARY OF THE ANALYSIS FINDINGS

This section presents a summary of the analytical findings to allow for their synthesis towards the development of the thesis outputs. Only the details of business perspectives and attitudes, including the statistical findings from the nonparametric tests, are included in this summary; whereas, a summary of the sample details and business characteristics are excluded. The purpose of this summary is to highlight the findings that are considered statistically significant, in addition to those findings that support major concepts and constructs within the research literature. Moreover, rather than repeat the actual statistically significant results associated with the findings, only a simple narrative of their importance, supported by the sample percentages, is given. The summary starts with business perspectives and attitudes as follows:

- 18 per cent lacked knowledge about the meaning of innovation;
- 75 per cent sourced ideas and knowledge externally;
- external sources of ideas and knowledge include existing clients and new customers (57.6 per cent), suppliers of goods, equipment and materials (58.6 per cent), industry websites and trade publications (56.6 per cent);

- internal sources of ideas and knowledge from staff and employees within the business (51.5 per cent);
- 66 per cent believed innovation was very to extremely important to the overall success of the business;
- 69 per cent believed providing innovative products and services to their customers was very to extremely important;
- 74 per cent believed it was very to extremely important for them personally to be involved in a continual learning process;
- 69 per cent believed it was very to extremely important for their staff to be involved in a continual learning process;
- 70 per cent of respondents said they were very to extremely likely to pay for, or provide flexible hours, for staff to attend training programs;
- 84 per cent believed it was very to extremely important to give empowerment to their employees;
- 98 per cent believed it was very to extremely important to have good staff for the overall success of the business;
- 50 per cent believed it was very to extremely important to use some form of planning procedures for innovation activities;
- 30 per cent believed it was very to extremely important to use formal, or written, planning procedures for innovation activities;
- 90 per cent believed it was very to extremely important to listen to their customers' feedback about the products and services they provide;
- 89 per cent believed it was very to extremely important for customers to complain about products and services they receive if they were unhappy;
- 67 per cent did not have a set procedure for dealing with customer feedback or suggestions about products or services;
- the most frequent innovation process activities undertaken during the previous 12 months include:
    - purchase of new machinery or equipment (77.9 per cent),
    - regular scanning of external environments (66.3 per cent),
    - undertake specialised training courses (49.5 per cent),
    - introduce new marketing or promotion campaign (41.1 per cent),
    - and introduce new management techniques (40 per cent);

- HRM practices undertaken include:
    - flexible work hours and/or job rotation (82.9 per cent),
    - open book/open door communication policy (69.7 per cent),
    - pay above industry wages (68.4 per cent),
    - employee bonus reward/incentive payments (53.9 per cent),
    - regular staff feedback meetings (52.6 per cent),
    - implement employee empowerment procedures (42.1 per cent);
- 74 per cent had adoption rate timeframes for new products, processes or services within 1–2 months;
- 83 per cent had adoption rate timeframes for new ideas or knowledge within 1–2 months;
- statistically meaningful measures of association exist between:
    - encouraging new ideas from staff and rewarding staff for new ideas;
    - encouraging new ideas from staff and fostering no-blame work environments;
    - actively seeking customer feedback and actively improving service delivery;
    - actively improving service delivery and introducing new marketing techniques;
    - introducing new marketing techniques and improving management processes;
    - the importance of formal and informal planning procedures for innovative activities;
    - the importance of having innovative products and services in conjunction with informal planning procedures;
    - the importance of flexible hours for staff training in conjunction with paying for or subsidising staff training;
    - the importance of innovation generally in conjunction with having innovative products and services; and,
    - the importance of planning for new goods and services in conjunction with the use of informal planning procedures.

Some of the less statistically significant, and perhaps unexpected, findings include the following points.

- 23 per cent specifically sought staff with higher education qualifications when employing new staff;
- 23 per cent who believed employing staff with some form of tertiary education was very to extremely important in helping the business build innovation capabilities;
- 29 per cent believed collaboration to be somewhat to not-at-all important in helping their business build innovation capabilities;
- 41 per cent said they were very unlikely to undertake any further education or training;
- 21 per cent of respondents said they were fairly to very likely to undertake a tertiary course or training program within the next 12 months.

The reason the above findings are unexpected is because they do not support the general trends within the innovation research literature. For example, the general belief within the literature supports employing staff with higher education qualifications; whereas, 77 per cent of respondents disagree with this notion. Furthermore, collaboration is espoused in the research literature as being a very important aspect for helping to enable innovation activities between co-operating businesses; whereas 29 per cent of sample believed this not to be the case and 34 per cent saying it was only moderately important. The last two points highlight how disparate perceived views can be when compared to actual beliefs with only 21 per cent saying they were fairly to very likely to undertake some form of training in the next 12 months; yet a majority of 77 per cent held the view that ongoing education and training was very to extremely important for their own personal development. In brief, by combining the new factors derived from the factor analysis procedure with the findings listed in the summary above, the overall findings are integrated to form three outputs: a propositional inventory; a conceptual small business model and an innovation planning framework, discussed next.

4.5 DEVELOPMENT OF THE OUTPUTS

This section discusses the objectives for the development of a propositional inventory, a conceptual model and an innovation planning framework. Indeed, even with the vast number of research papers and published material focused on innovation generally, the notion remains that a paucity of empirical research on small business innovation continues to exist (Hausman, 2005), particularly from a regional Australia perspective (Bhattacharya & Bloch, 2004; Prajogo, 2006). The primary objective for the

development of these outputs is to make a substantive contribution to theory building, one explicitly focused on small business innovation processes. For instance, Tan, Fischer, Mitchell, & Phan (2009) argue that very few small business researchers are 'devoted specifically to theory building' (p. 243). Theories provide explanation of how things function given particular circumstances, or why events occur given certain conditions. On that basis, theory is defined as 'a set of interrelated constructs (variables), definitions and propositions that presents a systematic review of phenomena by specifying relationships among variables with the purpose of explaining natural phenomena' (Kerlinger, 1979, p. 64). Therefore, the first stage of this theory building process is development of a propositional inventory, discussed next.

4.5.1 The propositional inventory

One popular format used in theory building resulting from qualitative data analysis is the development of a propositional inventory, according to Tan et al. (2009). Described by Goode as 'a listing of formal declarative statements of relations between two or more variables' (Goode (1971) as cited in Aguirre, 1976); a propositional inventory aims to synthesise usually qualitative research findings into a set of formal conclusions (Ferguson, 2001). The output normally consists of a series of testable propositions concerning cause and effect relationships between variables, which often mirror the format of hypotheses testing (Tan, et al., 2009). In brief, by synthesising the findings of this thesis with the findings of the literature review, a propositional inventory focused on building innovative capabilities within small businesses was developed. Thus, each of the following 10 propositions stated is deemed to have the potential outcome of helping a business build on its innovative capabilities; however, a more detailed explanation for the construct of innovative capabilities is discussed.

The term capability is defined as (having the) power of, to do something, undeveloped or unused faculty (Anon, 1987); essentially, the ability and/or capacity to do or produce something. Therefore, innovative capability could be defined as the capacity to innovate. Alternatively, Siguaw et al (2006) argue that innovative capability is more appropriately conceptualised as innovation orientation; whereby, the level of a businesses innovative capabilities is actually equal to a business's level of competency in three specific areas. These competencies include 1) learning philosophy 2) strategic direction and 3) transfunctional acclimation; which when combined form the basis of

what is called 'organisational competencies that emerged from possessing a strong innovation orientation' (Siguaw, et al., 2006, p. 564). The authors define learning philosophy as a businesses underlying attitude toward learning, acquiring and integrating knowledge into the business processes to facilitate innovation. Strategic direction is defined as the activities and beliefs that drive the business towards future innovation goals. Lastly, transfunctional acclimation is concerned with encouraging and embedding knowledge transfer throughout the entire business, whilst maintaining a diversity of views and opinions, which fosters shared beliefs and a universal understanding about the importance of innovation. Importantly, the authors contend that the conceptualisation of organisational competencies shares similarities with other research linked to innovation/dynamic capabilities'; yet where the three elements of organisational competencies contribute to a single system: innovation orientation.

As with the majority of organisational systems, the three main components that make up the innovation orientation construct are also made up of different sub-components. As a consequence, this system as a whole will not be completely efficient if any of the independent parts cease to function; therefore, the behaviour of each individual part and its effect on the entire system are dependent on the other parts functioning in unison. Within the three main identified components of the system there resides a subset of associated competencies which include: resource allocation competencies; technology competencies; employee competencies; marketing competencies and operational competencies. Underpinning these competencies is organisational culture and the knowledge structure that shapes and directs how the business operates based on how it interprets and utilises acquired knowledge and expertise. The research findings by Siguaw et al (2006) on linking the various competencies to innovation related outcomes resulted in the development of a model pertaining to innovation orientation; whereas, for the purposes of this thesis the construct of innovation orientation is strongly associated to the concept of innovative capabilities. In brief, innovative capabilities pertain to the business's ability and levels of competency - or capacity - to undertake activities that will generate innovation outcomes.

Small business propositional inventory for building innovative capabilities

Proposition 1: Maintaining a focus to seek out, and a willingness to introduce within short adoption rate timeframes (1–2 months), new products or processes and/or ideas and knowledge will have positive effects on building innovative capabilities.

The act of adoption is a well researched innovation concept, whereby Downs and Mohr (1979) assert it is such an integral behaviour that it is indicative of a business's level of innovativeness. Similarly, Damanpour (1991; 1989) contends that adoption of innovation is a precursor activity that spurs the internal generation of further innovation. Dewar and Dutton (1986) argue that different levels of adoption rates occur depending on the complexity of the innovation (radical or incremental) being adopted, and the knowledge depth of the business doing the adoption. The common link between them all is that the actual adoption process leads to improvements in the business's depth and diversity of knowledge leveraged from external sources, and as this knowledge becomes embedded it helps build and enhance the business's levels of innovative capabilities.

Proposition 2: Routine engagement in planning activities (formal or informal) for the introduction of new goods or services, and conducting regular progress appraisals of these plans will have positive effects on building innovative capabilities.

The underlying problem involved in planning for innovation, either formally or informally, is the complex interconnected relationships between the constituent activities and enablers that contribute to resulting outcomes. Nevertheless, there are a range of activities and behaviours that, if they become routine and embedded in operational procedures, can form a plan that guides the business towards greater certainty for achieving innovation outputs and outcomes. For example, de Jong (2006) researched innovation taxonomies in small businesses and posits that taxonomies can highlight the differences in the business strategies of innovative firms, where they can effectively map the variations in the rates, sources and nature of innovation due to the heterogeneous nature of small businesses. Therefore, while obvious cultural, attitudinal and operational differences exist within small businesses, it is possible to develop planned routines and behaviours that are conducive to achieving higher levels of innovation. Additionally, embedded within these routines and behaviours are monitoring processes to assess the progress of these planned innovation activities. Similar to a road map with alternative routes available to reach the same destination,

having a plan available provides greater certainty of reaching the final destination; which in this case is the build on one's innovative capabilities.

Proposition 3: Maintaining a focus towards strategic development and broadened market orientation will have positive effects on building innovative capabilities.

As discussed in the previous paragraph, strategic development involves putting together a plan aimed at achieving a desired outcome; therefore, planning and strategic development go hand-in-hand towards building innovative capabilities. The benefits attained from a broadened market orientation are well documented in the research literature, and is considered the driving force behind a business's capacity for organisational learning. This aspect is particularly important in terms of acquiring external knowledge and information on customers and competitors that becomes embedded within the business through the process of absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002). However, Jones (2004) argues there are limitations to the benefits derived from market orientation theory because a business's organisational learning capacity is dependant on how they interpret and convert the information into usable knowledge. This involves what Jones calls 'higher-order (generative) learning processes' (2004, p. 364) which are not directly related to the quantity of information available, but the quality of the information actively sourced and the business's ability to process that information. Nevertheless, it is assumed that most business operators have some ability to interpret market information to a level that will help them develop competitive innovation strategies; which in turn, will help build on their innovative capabilities.

Proposition 4: Maintaining a focus on continuous improvement of customer service delivery will have positive effects on building innovative capabilities.

Continuous improvement has come in many guises over the years dating back before the Deming Cycle (J. R. Evans & Lindsay, 1999) and the Japanese process of Kaizen, and is still an important concept for total quality management. Thus, the old adage: 'There is always room for improvement' holds true in the context of building innovative capabilities linked to customer service delivery. Indeed, anecdotal evidence suggests the only difference between two identical stores selling similarly priced product is inevitably attributed to variations in the customer service delivery. For example, Weiner (2005) argues that the creation of customer value through excellent

service is important for engendering customer loyalty; and is another low-cost way for a business to build on, and improve, their innovative capabilities.

Proposition 5: Proactively seeking customer feedback, and acting on that feedback where necessary, will have positive effects on building innovative capabilities.

While it might seem obvious for a business aiming to satisfy customer needs to speak directly with the customers, not all businesses operators do. For example, a study by Evans and Sawyer (2009) into regional small businesses in South Australia found that many owners misunderstood the dynamic changes of consumer culture and buyer attitudes over time, particularly when they had operated the same business for more than two decades. The authors reported there was an obvious need "to improve selling skills and customer focus" (N. Evans & Sawyer, 2009, p. 361) of many older business owners. Considered an integral component of most continuous improvement programs, it entails proactively seeking customer feedback and using that feedback to make improvements in either the service delivery or product offerings; thereby, allowing the business to better cater for the needs of their regular customers. If one is to take the most basic view of customers being the lifeblood of any business, then making sure you satisfy customer needs is of critical importance. Engaging with customers in a proactive way to seek their feedback is an essential component of building on a business's innovative capabilities; mainly because it has the potential to capture new ideas or knowledge that can be applied directly within the business to make continuous improvements.

Proposition 6: Maintaining a focus on continuous improvement of management processes and operational procedures will have positive effects on building innovative capabilities.

As already discussed in propositions 4 and 5, making continuous improvements throughout the business is an essential strategic component towards attaining, and maintaining, a sustainable competitive advantage. Hence, making continuous improvements to management processes and operational procedures is also extremely important. While such improvements may not result in a new product or service being commercialised as a way to create value for the business, they do result in efficiency gains that translate into cost savings. For example, Garcia and Calantone (2002) argue that adoption of an innovation that saves the business money is just as important as an

innovation that generates additional revenue. Therefore, improved management processes that save time and improve efficiencies, or operational procedures that make service delivery more cost-effective, both play an important role in creating internal value for the business through cost savings. Moreover, because these two areas add to the tacit knowledge of the business, they also have the ability to improve the business's level of innovative capabilities.**Proposition 7**: Provision of flexible work hours and financially subsidising staff to undertake personal development courses and regular skills training will develop staff with (1) well-developed people and customer service skills; (2) improved leadership qualities and effective decision-making abilities; (3) improve levels of employee empowerment through proactive engagement will all have positive effects on building innovative capabilities.

One of the interesting findings from the primary data was that 98 per cent of respondents believed that it was very to extremely important to have good staff to ensure overall success of their business. As a result, this proposition combines this sentiment with the findings that emerged from the literature review which aims to improve the levels of job satisfaction of employees; whereby providing flexible work hours and subsidising employee training is one approach to achieving this aim. There are several benefits the business will achieve from subsidised employee training, three examples of which are listed in the proposition itself. Another benefit is reduced employee turnover; which in turn promotes improved employee-customer relationships over the long term that facilitates customer loyalty. A further benefit derived from improved employee empowerment according to Siguaw, Simpson and Enz (Siguaw, et al., 2006) is knowing the employees are capable of running the business autonomously because they feel their contribution are highly valued. Even though this proposition on the surface may not appear to contribute to an increase of a business's innovative capabilities, training and rewarding employees stimulates employee activities toward innovation. For example, Siguaw et al (2006) assert that a loyal and dedicated employee is more prone to become proactively involved in the innovation process, to openly suggest improvements in operating procedures, and to further enhance the levels of customer engagement. Therefore, by looking after employees through enhanced human resource incentives, a business can build on their innovative capabilities (Siguaw, et al., 2006) through greater employee commitment and loyalty.

Proposition 8: Undertaking regular scanning of operating environments (internal and external) enhances the ability to identify and potentially optimise new opportunities; and thereby, will have positive effects on building innovative capabilities.

One of the innovation enabling activities that is commonly referred to in the innovation research literature is the scanning of operating environments to source new ideas, products, services or emerging opportunities. For example, Hyland and Beckett (2005) contend that businesses continuously scan their operating environments in search of new ideas and products as a way towards engendering an innovation culture. Additionally, scanning the operating environment may also identify potential opportunities for the business to capitalise on; whereby, such opportunities may involve collaboration with other businesses through sharing resources and intellectual capital so as to fully capitalise on these opportunities. Regular scanning activity may also enable a business to identify emerging trends from outside of their own industry, thereby giving them first mover advantage if they are able to quickly develop products or services to meet the customer needs connected with the new trend. Hence, regular scanning of operating environments, both within one's own industry as well as outside the industry, is an essential activity for the acquisition of new ideas and knowledge; which, once properly interpreted and assimilated within the business, would lead to improved innovative capabilities.

Proposition 9: Establishing and maintaining links with similar businesses, including the proactive engagement in networking opportunities, will have positive effects on building innovative capabilities.

The importance of establishing and maintaining networks as a way to build innovative capabilities has been extensively researched within the extant innovation literature. Not only does networking enable the acquisition of new ideas and knowledge, it also facilitates the sharing of resources and intellectual capital via the establishment of collaborative relationships and joint venture partnerships. For example, Mort and Weerawardena (2006) argue that network relationships are an important element for entrepreneurial businesses with an innovative culture who aim to enter into export markets. According to a systematic literature review undertaken by Pittaway et al (2004), the many benefits of networking for small businesses in the United Kingdom are crucial for not only providing avenues to share resources and knowledge, but they

also form the basis of innovation clusters that can leverage off their experience and expertise for building community capabilities in innovation. Thus, networking promotes more widespread collaboration and facilitates access to external resources and intellectual capital; therefore, it facilitates the building of innovative capabilities.

Proposition 10: Subscription to, and regular reading of, industry magazines and trade or research journals to source information about new products, processes, trends, marketing ideas and operational knowledge will have positive effects on building innovative capabilities.

As an adjunct to proposition 8, this proposition is simply about identifying a variety of information sources for obtaining information relevant to new innovations and associated activities. The primary aim underpinning this proposition is to remain informed and current about what is going on in any given industry the business operates within, while also sourcing information from outside the industry. The reason for this is because there can be industry crossover between emerging trends that businesses need to remain aware of. Furthermore, it allows a business to identify opportunities in different markets that would allow the business to diversify from their current product range or services. The main purpose is for the business owner to be aware of what is happening in terms of new products, ideas and knowledge; and for them to adopt some of these innovations as a way to build on their own innovative capabilities.

In brief, by engaging in the various activities associated with each of the stated propositions, a business will increase the likelihood of building on its current level of innovative capabilities. Next, the construction of the conceptual model utilising the literature findings combined with the propositions is discussed.

4.5.2 The conceptual small business innovation model

Using the foundational principles underpinning the 10 propositions, a conceptual model for building small business innovation capabilities is constructed. Presented in Figure 4.14, the conceptual model features three panels detailing: (1) innovation-enabling activities; (2) innovation outcomes; and (3) the business benefits that can potentially be achieved. Presented in a flowchart design, the model aims to drive innovation outcomes through the use of innovation activities that not only help build innovative capabilities, but will benefit the business in terms of enhanced competitiveness, operational cost reductions and improved organisational culture. The left-hand side panel in Figure 4.14

details innovation process activities such as early adoption timeframes, collaboration, seeking and acting on customer feedback and employee empowerment. Engaging in these innovation activities on a regular basis should translate into the one of two outputs along an innovation continuum, shown in the central panel. Asked discussed in the introduction to the thesis, it is acknowledged there are many different typologies and variations of innovation; however, it was decided to encompass all the variations of innovation within this continuum to keep the outcomes simple and easily generalised. Thus, radical innovation is associated with something completely new, while incremental innovation is normally something developed and improved over time. The attributes associated with the two forms of innovation are markedly different. For example, radical innovation often involves high costs and high risks, and usually returns high rewards; whereas, incremental innovation has lower costs spread over time, with less risk, but with moderate and often delayed rewards. The derived outcomes from engaging in either form of innovation include knowledge acquisition and skills, increased market share, improved profit margins and improvements in customer service delivery, discussed next.

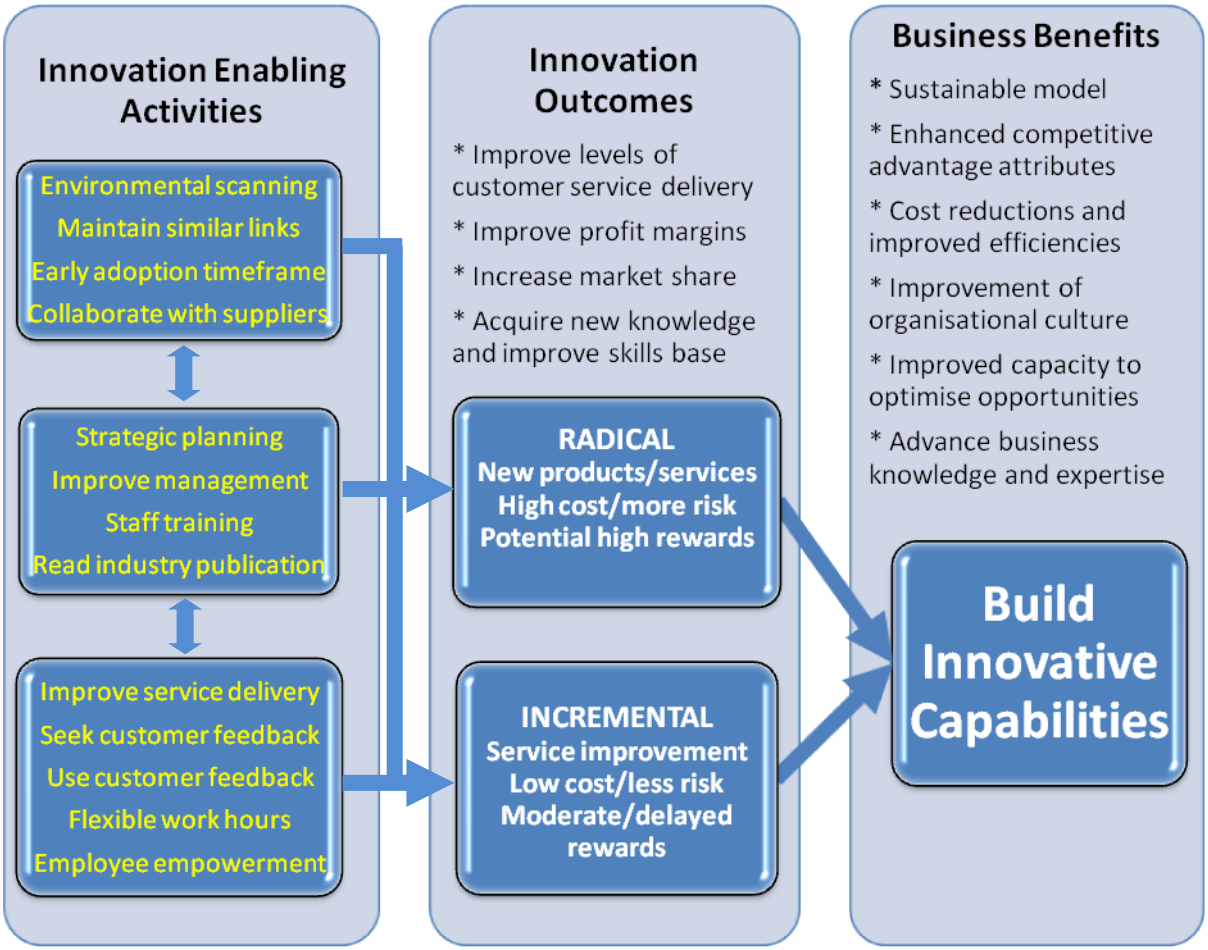


Figure 4.14 **A conceptual model for building small business innovation capabilities**

The right-hand side panel depicts the aggregated outcome from engaging in innovation processes: the building of innovative capabilities. As a consequence of engaging in innovative process activities, the business benefits from increased levels of innovative capabilities through the development of embedded knowledge, and potentially sustainable, business practices. Once these sustainable business practices are achieved, they lead to enhanced competitive advantage, improved operating efficiencies and organisational culture; when combined, these factors result in greater capacity to optimise opportunities through increased levels of knowledge and expertise. But while the building innovative capabilities presents a host of opportunities for achievable business improvements, both in terms of operational efficiencies and nurturing an innovation culture, they must first become embedded into the business's operating systems before transforming themselves into a sustainable business model, discussed next.

As discussed earlier in the thesis, the term capability is defined as having the power to do something, or an undeveloped or unused faculty; in essence it is the ability or capacity to do or produce something. An innovative capability could therefore be defined as the ability or capacity to innovate; whereby the ability or capacity is dependent on having a certain level of knowledge or experience pertaining to the activity being undertaken. In the context of innovation activities, Siguaw et al argues that innovative capability is more appropriately conceptualised as an innovation orientation where the level of a business's innovative capabilities is actually defined by its levels of competency in specific activities: learning philosophy; strategic direction; and, transfunctional acclimation. The more a business engages in these activities associated with these competencies, the more embedded they become in the business's operating procedures until they become systemised. However, the second part of the capability definition also means that, while there is the capacity to do or produce something, it still remains undeveloped or unused. Consequently, the innovative capabilities outcome is attributed to the final panel because a certain level of competency must be reached before it becomes embedded. For example, if a business adopts a particular innovative procedure and after adapting and trialling it, the procedure fails to create additional value, then the business should abandon it and move on to the next innovation. In brief, while some may argue innovative capabilities are an antecedent to innovation outcomes, this thesis argues true innovative capabilities are only formed once they attain certain levels of competency and become fully embedded in the business's operating systems. However, to ensure the development of such a sustainable business innovation model, an innovation planning framework is required, discussed next.

4.5.3 The small business innovation planning framework

The achievement of a sustainable business innovation model does not occur by happenstance; thus, an innovation planning framework is an essential tool to make it happen. Small business research on planning activities indicates that approximately 30 per cent of operators use some form of formal planning to guide their business development and operations (D. J. Cummins, 2005). Moreover, one business planning study likened the use of a formal business plan as akin to putting the business being into a straitjacket (Lancaster, 1997); whereby, the business had little, if any, room to move away from the designated plan. The findings of this thesis, however, demonstrate 50 per

cent of respondents acknowledge the importance of planning for innovation; whereby, 66 per cent believe planning for the introduction of new, or significantly improved, goods and services is very to extremely important. Therefore, the final output for this thesis is a small business innovation planning framework presented in Figure 4.15, the details of which are discussed next.

As with the previous two outputs, the small business innovation planning framework draws on a combination of the findings from this thesis, and concepts and constructs identified in the research literature. In many ways similar to the Deming Cycle (J. R. Evans & Lindsay, 1999) and Deming's 14 points on how to improve quality (Bartol, Martin, Tein, & Matthews, 2001), the planning framework is a three-stage iterative process of planning, testing and implementation. Moreover, unlike a formal prescriptive plan, a planning framework is a work in progress (E Milbergs, 2004); thereby, allowing for the alteration and adaptation of the stage's components to suit varying business formats and operating requirements. For example, a sole operator could dispense with the Stage 2 activity of engaging staff in planning and testing proposals; albeit, they may choose to involve friends and associates in this activity, or possibly seek to engage an external business adviser. The majority of activities in all three stages are applicable to virtually all sized businesses that wish to pursue a strategy towards building their innovative capabilities. Next, an overview of each stage of the innovation planning framework is discussed.

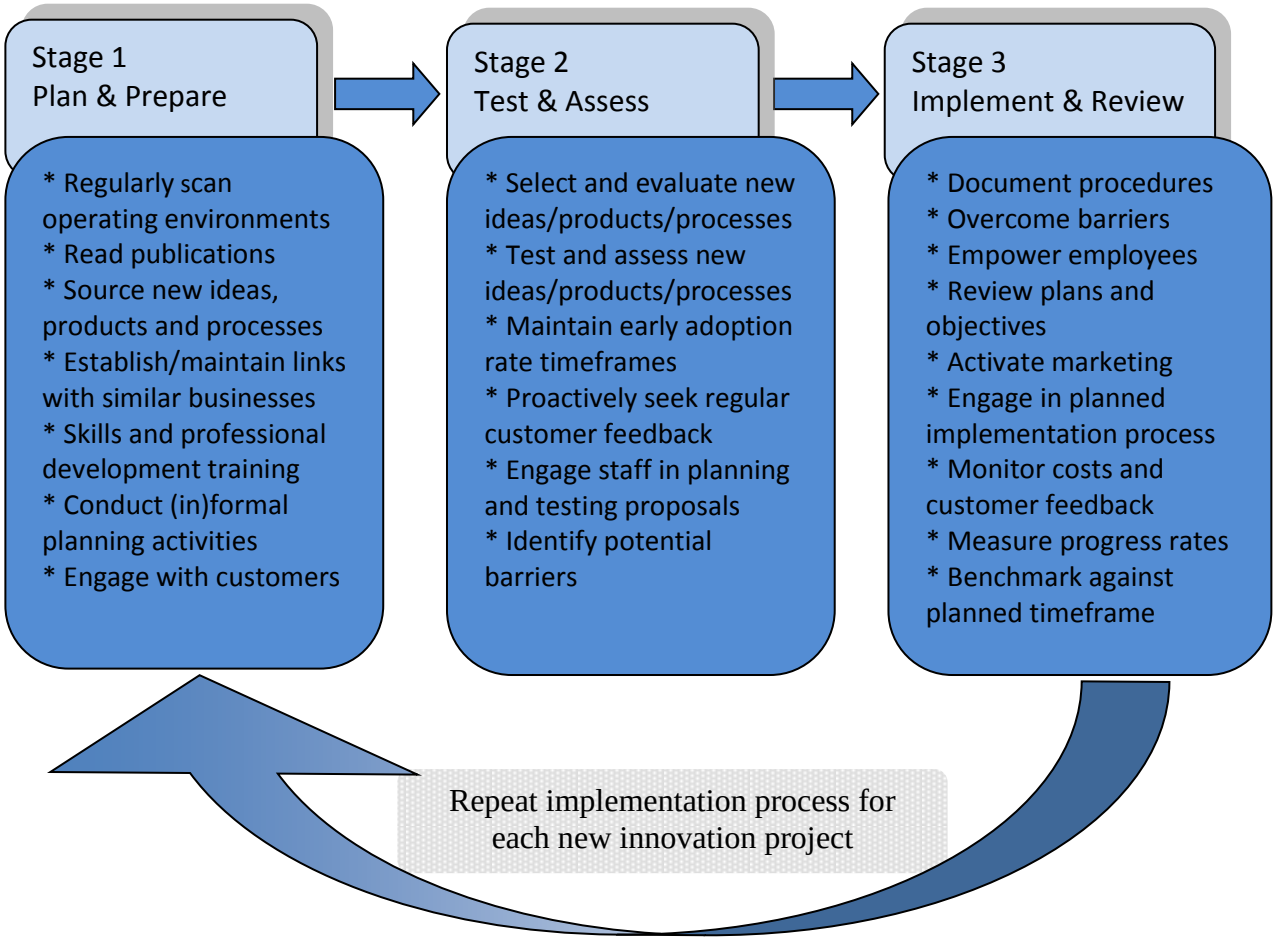


Figure 4.15 **A small business innovation planning framework**

Stage 1 The primary focus of stage 1 is concerned with the aspects of preparation and planning. Activities to facilitate the preparation of the initial plan include: regular scanning of operating environments; the search for new ideas, products and processes; networking with similar businesses; acquiring appropriate skills through training; and engaging with customers to acquire feedback and to assess the levels of market demand. For example, assessing the levels of market demand for the new product or service is essential for determining how stage 2 is to proceed. Proceeding with the development of a new product or service with negligible, or non-existent, market demand would be extremely high risk and potentially costly. Alternatively, constant enquiry by customers for an additional service or improved product would be indicative of market demand, thereby, preliminary planning activities should be undertaken.

Stage 2 With preliminary planning activities underway, stage 2 is concerned with testing and assessing the viability of the innovation to be implemented. The activities

involved during this stage include: selecting and evaluating the innovation; quick adoption rate timeframes; proactively seeking customer feedback; staff engagement; and identification of potential barriers. For example, staff members are usually the ones in constant contact with customers; hence, their input based on customer feedback about products and services is an invaluable part of the information gathering and assessment process. Furthermore, such information from the staff about customer requirements could lead to the identification of particular barriers that could limit the success of the new innovation.

Stage 3 After completing the test and assess procedures in stage 2, the final stage focuses on the implementation and review process. This is perhaps the most crucial stage of the planning framework, as evidenced by the well-known adage that 'the best laid plans may fail if poorly implemented'. Moreover, there are several important review activities which need to be adhered to for the purposes of successfully monitoring and measuring the progress of the implementation stage. For example, maintaining documentation of the implementation and review procedures is critically important for future reference, particularly if similar innovations are to be introduced in the future. The undertaking of these activities may initially appear foreign to many small business operators as evidence suggests they are generally poor record keepers (OECD/Eurostat, 2005). Additionally, monitoring of the implementation costs involved for comparison with the investment outlaid is also extremely important, as is benchmarking against the planned timeframe for the implementation of the plan. In brief, having an innovation planning framework sets in place a roadmap to help successfully navigate the entire journey involved in the planning, testing and implementation process. Next, drawing together all the findings from the analysis, a final conclusion is presented.

4.6 SUMMARY OF FINDINGS

This section presents an overall summary of the findings that emerged from the analytical results obtained through multivariate analysis techniques applied to the primary data. Firstly, using the *sample size determination for proportion* formula (Berenson, et al., 2007), a sample of 100 small businesses was deemed an acceptable data sample size for undertaking this type of exploratory research. Secondly, the primary data sample was drawn from three regional townships and the city of

Townsville, with 25 interviews conducted at each location. Construction of the survey instrument, a pre-coded questionnaire, was completed using guidelines from the Oslo Manual (OECD/Eurostat, 2005), in addition to the industry classifications being based on the ANZIC divisions. The primary dataset comprised 75 separate variables, with several variables in the form of multiple response answers; hence, to fully investigate the relationships with such a multitude of variables to analyse, it is appropriate to engage multivariate analysis techniques. For example, Hair et al. (1998) contend the application of multivariate techniques is suited because it enables multiple relationships to be examined in a more complete and realistic way, thereby providing a better understanding of the topic under investigation. Next, a brief summary of the nonparametric tests applied to the primary data is discussed.

A range of multivariate analysis techniques were applied to analyse the primary data, with the majority of these techniques being nonparametric tests. Initially, preparation of the raw data for SPSS was required such as: assigning variable names, variable labels and value labels; recoding of Likert scale answers into uniform conformity; attending to system missing values; and aggregation of the multiple response answers into a single answer. Following this preparation, a series of frequency and contingency tables and bar graphs were produced; whereby, the frequency tables presented sample percentages of the variables under investigation. The use of contingency tables was used to determine the relationships between certain variables; in addition to providing output for a number of the nonparametric statistical tests. The statistical test outputs included the Chi-square measure of association test, the Spearman's rho test and the Kendall's tau-b tests. Furthermore, the Chi-square goodness-of-fit tests for independence were applied to test a series of null hypotheses on 10 variables using levels of importance ratings, while two variables concerned the independence of adoption rate timeframe. Finally, factor analysis was applied to a single question with 23 sub-questions; whereby, the original 23 variables were reduced to eight new variables. Next, a brief overview of the main findings is discussed.

A sample of innovators The overarching finding is that the majority of small businesses in the sample are highly innovative, and engage in multiple innovationprocess activities on a regular basis. The main evidence supporting this conclusion is based on the short adoption rate timeframes for both new products/processes/procedures and for new ideas/knowledge. For example, almost

three-quarters of the sample (74 per cent) adopted new products/processes/procedures within a two-month timeframe; whereas, over four-fifths of the sample (83 per cent) adopt new ideas/knowledge within a two-month timeframe. Furthermore, there were high levels of respondent support concerning the importance of: customer and supplier engagement activities; staff training and employee empowerment; staff rewards and flexible work hours; planning of innovation activities; environmental scanning for sourcing new ideas, products or trends; and the purchase of new equipment and machinery. Alternatively, only low levels of collaboration activity were undertaken; and, more surprisingly, the value of hiring new employees with tertiary qualifications was given low importance as only 23 per cent specifically sought staff with higher education qualifications. Next, a brief summary of the thesis outputs is discussed.

By drawing on these findings, combined with the concepts and constructs identified in the literature reviews, three outputs were produced. The first of these is a propositional inventory, a series of 10 testable statements with the primary aim of enabling a business to build on its current level of innovative capabilities. The second output is a conceptual small business innovation model, which demonstrates how a business can build innovative capabilities. The model contains a list of prescriptive innovation process activities which, if pursued, will help the business drive towards producing either type of innovation output, radical or incremental. The implementation of this model should result in increased levels of innovative capabilities, in addition to business benefits such as cost reductions, advances in business knowledge and expertise which enhances competitive advantage. The final output, the small business innovation planning framework, is a three-stage iterative process based on: plan and prepare; test and assess; and implement and review. Each stage contains a set of prescriptive activities, that can be customised to suit various business types and circumstances, which when implemented will help the business navigate the innovation journey to arrive at a successful outcome. Once completed, the entire planning procedure is repeated for the next new innovation journey to be undertaken.

In summary, the majority of small businesses interviewed for this research sample demonstrated high levels of innovative capabilities. With business conditions such as decreasing sales revenue and increased overhead costs providing the impetus to drive innovation processes, the overwhelming majority quickly adopted new products or ideas as opposed to commercialising their own invention. Furthermore, customer and

supplier engagement rated high importance as sources of new products or ideas, as did the nurturing of human capital through staff rewards, flexible hours, subsidised training and employee empowerment. Interestingly, almost one in five respondents (18 per cent) had limited understanding or knowledge of innovation; yet, unknowingly, many were actively involved in innovation process activities on a regular basis. For example, two of the case studies in the following chapter openly considered themselves as non-innovators and, like many other respondents, were genuinely surprised once all the innovation process activities they were involved with were highlighted. Importantly, a closing comment from many respondents following their interview was that excellent customer service was just as, if not more, important than innovation.

CHAPTER 5

Innovative business case studies

Outline of Chapter 5	
Section	**Contents**
5.1	***Introduction*** Highlights the purpose of this chapter and introduces the three small businesses interviewed.
5.2	***Case Study 1: Charters Towers Tourist Park*** Provides a background of the business operators and their operating environment, lists the range of innovation activities undertaken. It examines the detail of each activity and how it was implemented within the business operations, discusses the outcomes, and concludes with an overview of why the business was determined as displaying high levels of innovative capabilities.
5.3	***Case Study 2: The Homebrewers Warehouse*** Details as for 5.2
5.4	***Case Study 3: Austin Glass*** Details as for 5.2
5.5	***Similarities and Differences*** Compares the various similarities and differences of the three businesses approach to problem solving, use of incremental verses radical innovation, market orientation, entrepreneurial traits and personal attitudes, strategic orientation, and overall operating styles.
5.6	***Conclusion*** Discussion of assumptions used to determine innovative capabilities, how these factors drive innovation activities, and conclude with a summary of the chapter's main points.

5.1 INTRODUCTION

This chapter examines three businesses deemed representative as innovation case studies because each displayed high levels of innovative capabilities. A case study by its very nature provides an in-depth examination of a single representative example of a particular social phenomenon being researched (Babbie, 2002). According to Collis and Hussey (2003) the case study constitutes a form of exploratory research; and therefore are particularly useful in research areas where theory building is required because of limited empirical evidence being available. In this context, these three case studies have been included to provide qualitative evidence pertaining to the mix of innovative activities and capabilities displayed by typical Australian regional small businesses. Smith (2000) contends case studies provide descriptive and insightful understandings of the activities happening within the business; whereby, the rich and contextually relevant data collected allows for the development of theory building to occur through the use

inductive research methods. Each case study was selected post hoc following the initial interview because they exhibited high levels of innovative capabilities. Combined, they provide an insightful glimpse into how successful small businesses foster an internal culture and attitude which transform innovation activities and practices into embedded capabilities. In brief, inclusion of three case studies was deemed to bring an added dimension of descriptive clarity to the profile of an innovative small business; thereby, adding further to the richness of the thesis findings. A short introduction of each business and the chapter structure are discussed next.

Two of the businesses operated in Townsville, while the third operates in the historical mining town of Charters Towers, and each business represents a different industry sector. The two Townsville businesses represented the manufacturing and retail sectors, while the Charters Towers business operates within the tourism/accommodation sector. All three businesses have been operating in excess of two decades; however, the owners of the Charters Towers business only purchased the business four years previous. None of the operators had any formal higher education business training, although one operator had completed a real estate management certificate through TAFE. The first three sections of this chapter examine each business in detail including their background and operating environment. The various subsections discuss the range of innovative processes undertaken by each business, how these processes were implemented and what outcomes were produced, before concluding with an overview of why each business was determined to be innovative. Next, Section 5.4 compares the similarities and differences identified within each of the businesses individual approaches, including such points as market orientation and entrepreneurial traits. Lastly, Section 5.5 discusses the assumptions used to determine why each business is deemed as highly innovative, before concluding with a summary of the chapter contents. The first case study, the Charters Towers Tourist Park, is discussed next.

5.2 CASE STUDY 1: THE CHARTERS TOWERS TOURIST PARK

The Charters Towers Tourist Park is situated in the former gold mining city of Charters Towers in northern Queensland, approximately130 kilometres inland from Townsville. Located on the intersection of the Flinders Highway and Gregory Development Rd with a population of 8,234 people, it is a popular tourist destination and regional agricultural services centre. The Tourist Park, operational for over two decades, is one of three

caravan parks in the city and was purchased by Steven and Maxine in 2007, in a condition they described as being 'very run down'. The Tourist Park offers a range of accommodation facilities including fully self-contained cabins, studio units, and standard powered caravan sites with individual ensuite along with unpowered caravan and camping sites. The couple's entry into business ownership, and the accommodation sector, is discussed next.

5.2.1 Business background

Steve and Maxine's initial experience in the accommodation/tourism services sector started with the purchase of a leasehold for a caravan park in Western Australia. After operating this venture for two years, the couple describe the experience as both useful and extremely frustrating. Importantly, this introduction to the accommodation service sector was a useful experience because it introduced them to a range of systems and procedures suitable for running this type of operation. It demonstrated the growth potential for a well-run caravan park, and how enjoyable such a venture could be. In contrast, their frustration came about because they were severely restricted in the improvements they could make to the business as a consequence of the leasehold arrangement. Their previous management experience was gained through employment managing a small shopping centre in regional Western Australia over a 12 year period. However, neither had any formal higher education related to business or management; albeit, Steve completed a real estate management certificate course through TAFE. Importantly, both had extensive hands-on customer service experience from previous employment roles in the areas of hospitality and retail. They were attracted to the Charters Towers Tourist Park for a number of reasons such as; attractive climate, good location, development and growth potential, it provided a major challenge and it was reasonably priced. In brief, conceding somewhat limited experience operating a caravan park, the first thing the couple did after purchasing the Tourist Park was to devise an informal market-orientated business plan, discussed next.

5.2.2 Developing an informal plan of action

The first thing the couple did following purchase of the park was to devise a market-orientated business plan; albeit, a fairly informal plan typical of many small businesses (Mankelow, 2008). Indeed, the actual plan took the form of an activities and objectives list, rather than a formally structured market-orientated business plan. Given their

limited experience operating such a service business, they felt such a list would help them learn more about their business through engaging with their customers. For example, Keskin (2006) contends there are important links between market-orientation and learning-orientation through customer engagement in small businesses; which in turn, facilitates innovation. Thus, the couple's informal plan consisted of a list of prioritised activities and objectives, with stated outcomes corresponding to specific timeframes, which the couple aimed to achieve. To engage directly with their customers they printed out copies of the list and placed them in various strategic locations around the entire park including; the central barbecue pavilion, laundry, toilet blocks and the reception area. The motivation for this was twofold: firstly, it publicly demonstrated to their customers they were determined to make significant changes to how the park operated, and engaged their customers by asking for feedback about the list. Secondly, it generated substantial interest among their long-term park residents, together with providing a central talking point with their regular customers, such as cattle station owners and frequent business travellers. In brief, the list of activities and objectives aimed to improve the park operations through customer engagement. Additionally, it provided the couple with several learning opportunities as it became an innovative marketing tool for the business, discussed next.

Without realising it, the activities and objectives list became an innovative marketing tool with a twofold outcome. Firstly, it engaged the park's regular customers (Keskin, 2006); and secondly, it provided unanticipated word-of-mouth promotion opportunities (O'Dwyer, Gilmore, & Carson, 2009). For example, an important aspect of market-orientation in delivering customer satisfaction, asserts Keskin (2006), which involves continually assessing the needs of customers as a way to increase the overall business performance. Furthermore, many of the parks permanent residents worked in local businesses; subsequently, they told their work colleagues about the changes happening at the park, which yielded further feedback and input of ideas. As each major objective on the list was completed, it was simply ticked as opposed to being taken off the list completely. In brief, without consciously considering the long-term impact of using the list to show the progress of changes being implemented, the couple had intuitively created an innovative marketing tool for engaging with their customers. The consequences of this action lent itself further to a second innovative marketing tool, word-of-mouth promotion, discussed next.

A word-of mouth marketing tool The second innovative marketing tool from the activities and objectives list was the provision word-of-mouth promotion opportunities (O'Dwyer, et al., 2009). This aspect of the list as an innovative marketing tool also came about by accident. By leaving each completed activity and objective on the list, the couple created the impetus for word-of-mouth promotion; whereby, the permanent residents would talk about the latest achievements with their friends and workmates, as would the regular customers and frequent business travellers. As more objectives and improvements were added to the list using customer feedback, this generated further interest from regular customers as well as local residents. For example, the first question asked by grey nomad travellers when they rang to make their booking would be: What has been crossed off, or added to, the list this year? Given the paths of many grey nomad travellers would cross at various locations, the objectives achieved and improvements made to the park became hot discussion topics when regular park visitors met. Importantly, asked whether they thought this list constituted an innovative market-orientated activity, the couple replied this was not their planned intention. They contend the primary rationale behind the introduction of the activities and objectives list was for obtaining constructive customer feedback, a process of learning-orientation (Keskin, 2006). Moreover, they felt the list simply, yet effectively, demonstrated their commitment to making improvements to both the park and the service levels offered. In brief, the list provided a low-cost word-of-mouth promotion opportunity; in addition to facilitating a learning-orientation process for building their knowledge towards enhancing their competitive advantage. The couple continued their market-orientation push, embarking on a program of community engagement, discussed next.

Fostering community social networks Continuing the theme of engagement, the couple set about engaging with local community residents, a form of social networking. The motivation behind this social networking activity was to inform the wider community of the changes taking place, to consolidate relationships with local suppliers, and to promote ‘the business in the best possible light’ in support of their social responsibility effort (Mankelow, 2008). Hence, the second innovative marketing initiative undertaken by the couple was the introduction of free morning tea with scones. The purpose behind this initiative was again twofold; firstly, it allowed the park customers to be introduced to, and socialise with, local residents. Secondly, the morning teas encouraged local community residents to observe the changes and improvements

being made to the park. An idea conceptualised by Maxine, the campaign started by placing a regular invitational advert in the local newspaper; in addition to placing flyers around the park to inform their customers. The scones were baked fresh by Maxine, and both she and Steve would set up tables and serve the morning tea in the central barbecue facility. In brief, this marketing initiative proved extremely successful in bringing together the park's customers with local community residents; but it also provided another opportunity for word-of-mouth promotion, discussed next.

When asked to elaborate why they had undertaken this innovative marketing initiative, the reply was to foster an opportunity for word-of-mouth promotion. Firstly, Maxine explained that many park visitors had little opportunity to interact with local community residents apart from interactions with local business operators. To address this shortcoming, by putting on a free morning tea for the park visitors with an open invitation to local community residents, the event would bring the two groups together in a convenient and convivial way. Secondly, and perhaps more importantly, Maxine identified an opportunity to bring local community residents into the park; whereas previously, most would have no reason to visit the park unless someone they knew was staying there.

Indeed, the morning teas provided the opportunity for the park customers to interact with local community residents. The additional benefit not only allowed local residents to inform the park customers of what the city had to offer; but it also allowed local community residents to see the transformations taking place at the park itself. This innovative marketing initiative served as a powerful word-of-mouth promotional tool throughout the local community. However, Maxine conceded the success of the initiative was beyond their initial expectations. The park itself benefited by generating widespread community interest, local residents benefited through new friendships being established; and importantly, the entire city benefited through greater interest being generated in the regions tourist attractions. The morning sessions were so successful they created a copy-cat effect, and were discontinued when the other tourist parks introduced them. In brief, the morning tea sessions were extremely successful at providing first-mover advantage for engaging in local community networking for the park, in addition to the benefits derived from word-of-mouth promotion. Buoyed by the success of this initial foray into social networking, another community engagement activity was initiated, discussed next

Engagement in social responsibility Following the successful morning tea sessions, Maxine devised another marketing initiative of underpinned by social responsibility. Still focusing on the theme of community engagement between the park's customers and local residents, this initiative focused more on supporting the local community (Mankelow, 2008). The activity involved introducing catered evening meals; whereby, the meals were provided by local community organisations such as; Lions and Rotary clubs, Scouts and Guides and local sporting clubs. The initiative was started by sending letters of invitation to all the local community groups to attend a meeting to discuss the provision of evening meals for park visitors. The concept involved participating community organisations cooking meals on specified nights for the park customers as a fund-raising venture. Park customers had the opportunity to engage with local community residents, in addition to enjoying reasonably priced, locally cooked, meals. The local community clubs and groups benefited by raising funds for their particular organisation. Importantly, not only did the activity provide an alternative method of fundraising for the community organisations, but it was an excellent public relations and social networking exercise for the park generally. For example, members of the participating community organisations acted as another conduit for word-of-mouth advertising about the park's activities, while extolling the virtues of their community organisation to the park's customers. The various community organisations involved did so on a rotational, rostered, system; thereby, spreading the funds raised across a wide number of different organisations. Furthermore, the meal nights increased the number of local residents introduced to park; in addition to park customers forming new friendships while finding out more about the local region. In brief, this marketing initiative proved to be extremely successful for consolidating the park's reputation as a socially responsible business by supporting local community organisations. The meal nights then led to the introduction of free entertainment, discussed next.

The next marketing initiative is demonstrative of simple value adding to the park's customer experience, with the introduction of free entertainment. The peak tourist season in Charters Towers runs for approximately four months, from early April until the end of July. Over the past three years the park has provided free nightly entertainment by way of a bush poet. This arrangement came about because the city hosts the ten-day Charters Towers Country Music Festival, which incorporates the Gold City Festival of Australian Bush Poetry, during early May. To capitalise on this festive

activity the couple approached a regular performer at the poetry festival, who was also a seasonal customer of their park. In return for his performance services, the poet and his wife get free site accommodation for the duration of their three-month stay. The poet not only gets the opportunity to try out new material on the park audience, but he generates additional income through audience donations and CD sales. Indeed, this value adding initiative became an important point of brand differentiation between the park and its two competitors; whereby, the actual marketing of entertainment was

Figure 5.1 **Bush poet, Neil McArthur, in action**

ıe festival. In brief, by value adding to the park's customer experience, the couple created strong brand differentiation that leveraged off, and aligned itself, with the nationally recognised Gold City Festival of Australian Bush Poetry. Continuing to value add, the next innovation introduced was far more arduous, yet complemented, the introduction

of free entertainment, discussed next.

Figure 5.1 **Bush poet, Neil McAthur, provides poetical entertainment**

Value adding through adoption The next innovation involved adoption of an idea, rather than introducing an innovative concept they conceived. After attending a caravan park operator's conference in Tasmania, the couple were introduced to the idea of obtaining a liquor licence. Upon their return, they set about investigating what was

required to make this a reality. Interestingly, they did not undertake any formal research into the market viability of obtaining a liquor licence as mounting anecdotal evidence supported the development. For example, customer support was evident because of numerous enquiries from park customers since day one about whether they sold alcohol on the premises, an innovation process referred to as customer driven demand (von Hipple, 1988). Because of the consistency of these customer enquiries, the couple were confident the service could be successful; and therefore, substantially value-add to their customers' convenience without requiring them to leave the park complex. A significant amount of preparatory work, such as learning compliance rules and regulations, was required over a nine-month period to prepare their application for the liquor licensing board. The couple believed the additional work, and financial outlay, was well worth the effort as the increase in revenue generated by the alcohol sales is considerable. Indeed, selling alcohol within a tourist park is not new; however, the adoption of the idea was new for this business and the region. Similar to the other innovative initiatives introduced, they gained first mover advantage whilst further enhancing their strategy of differentiation. In brief, the adoption of the idea to sell alcohol on the premises was a customer driven innovation which provided a major point of differentiation to their competitors; it improved customer satisfaction through value adding, and it significantly improved their revenues. In essence, the focus of their marketing orientation was to seek a point of differentiation through innovation, discussed next.

Because there are three other caravan/tourist parks within the city region, Maxine and Steve focused on creating points of differentiation to their local competitors. For example, questioned why they had discontinued the morning tea and scones sessions, Maxine replied: 'All the other parks had started doing it too, so we didn't want to be doing what they were doing. Even though we started it, we wanted to differentiate ourselves from the rest by making sure we were doing something different'. Interestingly, when queried as to whether they thought the initiatives they introduced were innovative, both replied 'No' and went on to explain it was more about obtaining, and maintaining, a competitive advantage through differentiation. In brief, the couple asserted that to maintain a competitive advantage meant having a point of differentiation from your competitors; therefore, what they were doing was simply that:

maintaining their competitive advantage. A further competitive advantage could be obtained by joining an industry association, discussed next

Collaboration through an association Part of the couple's strategy for obtaining, and maintaining, a competitive advantage was to join an industry association. The advantages of doing this were initially thought to be numerous; however, the most important advantage of joining the industry association was a clearly identified level of service rating which was recognised nationally by regular tourist park visitors. For example, the park had to meet with the industry association compliance standards, in conjunction with developing a procedural manual to cover all operational aspects of the park. By becoming an industry association member they were allocated a star service rating similar to the system employed by motels, such as three, four or five star ratings. This resulted in further enhancement and consolidation of their service level credibility to their potential, and regular, customers, and enhanced their marketing material.

Notwithstanding these initial marketing benefits, they felt other additional benefits derived from the industry association membership were minimal. The industry association membership did not lead to any increase in collaboration activities with other association members. For example, it did not lead to any joint marketing ventures - apart from being listed in the association's national directory - nor did they see a significant increase in customer numbers as a result of their association membership. Nevertheless, the industry association membership did enhance their competitive advantage through the promotion of nationally recognised service standards. In brief, the industry association membership was considered a necessary cost to effectively boost the parks profile in terms of their national marketing strategy mix. It was one small part of a number of elements that contributed to their market orientation strategy towards innovative differentiation.

5.2.3 Tourist Park summary

In summary, the surprising aspect of this case study with Maxine and Stephen was they did not consider themselves to be innovators. They achieved first-mover-advantage with the introduction of: an activities and objectives list; morning tea sessions; competitively priced, locally cooked, meals; free in-park entertainment, and; the on-site sale of alcohol. These innovative initiatives were undertaken to differentiate their business from their competitors; yet, at no stage had the couple considered these

activities to be anything more than building a competitive advantage over their competitors. The outcomes of these activities yielded considerable marketing orientated benefits which include: strong word-of-mouth promotional opportunities; increased community engagement; recognition for wider social responsibility; and strong revenue growth. Interestingly, while achieving first-mover advantage the local competitors quickly adopted their initiatives, leading the couple to discontinue some of their activities simply because they felt their competitors had diminished their point of differentiation. The couple emphatically believed it is important to maintain a strong competitive advantage over your competitors; consequently, their underlying strategy was to focus on establishing points of differentiation. This entailed constantly looking for new ideas, trying out new things; and most importantly, finding new ways to value-add to the services and facilities they currently provided. Indeed, the couple did not consider their ideas and actions to be particularly innovative: they simply wanted to stay ahead of the competition.

5.3 CASE STUDY 2: THE HOMEBREWERS WAREHOUSE

Greg Young runs a successful distribution and agency business marketing plumbing supplies, a business he purchased from his father almost thirty years ago. However, Greg's personal passion is the science of home-brew beer; a passion which provided the impetus for setting up his own homebrew supplies and equipment retail business in the early 1990s. His passion for homebrew beer is clearly evident as he discusses the science involved in homebrew techniques; but just as evident are his entrepreneurial characteristics as he talks about the problems encountered, the finding of solutions, and how these solutions created opportunities for starting The Homebrewers Warehouse. For example, problem-solving and identifying opportunities are characteristics of an entrepreneur according to Schaper & Volery (2004), who postulatedwhile many opportunities exist, it is an entirely different matter for them to be capitalised on by entrepreneurs because they still have to be identified and exploited. Moreover, the authors further assertthat the majority of entrepreneurs could be categorised as ‘calculated risks takers’ (p. 34); hence, these characteristics of entrepreneurship are certainly applicable to Greg’s business ventures. Reluctant to consider himself an entrepreneur or innovator, his entrepreneurial journey started through family connections, discussed next.

5.3.1 Business background

Greg's introduction into the world of business started in the insurance industry, selling insurance products for the national insurance company AMP for five years. His only formal business education was acquired through an intensive, in-house 'month or two' of sales and marketing techniques training. Following this period, and using money from cashing in his superannuation plan, he had the opportunity to buy part of his father's business, a manufacturer's agency reselling plumbing brassware. The aim was to develop his own distribution business, giving him greater control of the business; which then complement his father's agency business. For example, by buying his father's stock Greg was able to set his own prices; and thereby, control the profit margins instead of simply being paid a commission by the manufacturer as was the case with his father's business. Thus, Young's Distribution Centre became operational in 1983.

However, Greg's brother also bought part of their father's agency business at the same time, specialising in a similar range of plumbing and tap ware products. Consequently, Greg's brother initially became a direct competitor; whereas, over time they created a family business that was independent of each other. Working collaboratively, they collectively structured their product ranges and services to be mostly complimentary to those provided by each other's business. This structure worked in the family groups favour when southern manufacturers were looking for new agents and distributors for their products in the North Queensland region. In brief, his entry into business ownership provides an example of how Greg proactively sought out opportunities to capitalise on. Albeit, like his future business ventures, the decision to move forward was based primarily on gut instinct with moderate levels of risk involved, discussed next.

Believing in gut instinct An intriguing aspect about Greg's move from employee to business owner was he did not plan for the move, relying on intuitive gut instinct (Matzler, Bailom, & Mooradian, 2007). He readily admits to not developing a business plan for purchasing part of his father's business, either formally or informally, but acted on what he describes as gut instinct. His experience with AMP had already proven he was an adept and competent salesperson; however, imbued with entrepreneurial characteristics (Jill Kickul & Lisa K. Gundry, 2002), he could see the opportunity to

improve his father's business model. He identified an opportunity for exerting greater control over the agency model by becoming a distributor, rather than simply being a manufacturer's agent. For example, an agent is limited by what the manufacturer will supply for reselling; consequently, a product line selling well in Brisbane meant a high possibility of limited supply available for Townsville. But gaining supply control of the product lines sold necessitated purchasing the stock outright; thereby, increasing the risk levels attributed to capital outlay. The move to become a distributor presented greater opportunity over the agency model, but it also involved greater risk, discussed next.

Capitalising on identified opportunities often involves greater levels of risk, but Greg evaluated the risk levels as manageable given the increased profit yield. For example, he witnessed southern-based manufacturer's unfairness to North Queensland agents by restricting availability of certain stock-lines, sometimes for up to 9 months in duration. Thus, by becoming a distributor and purchasing the stock-lines outright, he identified the opportunity to provide a better service to reseller customers by guaranteeing regular supply. Not only had he identified a supply problem, but he turned the solution into an opportunity; which, according to Drucker (1994) is significant anentrepreneur seeks out change by identifying it as an opportunity that can be exploited. In brief, while not one for formal business plans, preferring to rely on gut instinct, he exhibits strong entrepreneurial spirit by contending that good opportunities far outweigh many of the risks involved. Indeed, this characteristic of entrepreneurship is a recurring trait that led him into the retail industry, discussed next.

5.2.2 Entering the entrepreneurial space

There are numerous anecdotes of serendipitous moments by well-known entrepreneurs, such as Richard Branson of Virgin group (Mills, Bailey, & Douglas, 2011). So too can Greg's entry into retail sales be considered as similarly serendipitous. Another of his passions was racing motocross bikes, and this passion led him into retail by becoming the regional distributor and retailer for a specialised brand of high-performance motorbike oil. Initially, the oil was only available in bulk drums from a southern-based distributor and was purchased specifically for personal use; however, so impressed was he by the oil that he saw an opportunity to become the local distributor, then retailer, for the brand. The business grew gradually, for example, by initially supplying only

regional motorbike servicing workshops. As the volumes increased, and the brand became well-known and more popular with local riders, he started retailing the oil from his own distribution centre premises. Indeed, he admits he started enjoying the retail side of sales, and jokingly argues the oil products allowed him to gently slide into the retail industry. In brief, another entrepreneurial characteristic is purported to be the pursuit of personal passion (Drucker, 1994), and it was Greg's passion for motorbike racing which ultimately led him into retail. Subsequently, his passion for homebrew beer resulted in the establishment of The Homebrewer's Warehouse outlet, discussed next.

A brewer's passion The establishment of the Homebrewer's Warehouse can only be described as a tale of personal passion, entrepreneurship and innovation. A seasoned home brewer of beer, Greg and a friend acquired a number of small 10 litre post-mix soft drink kegs made from stainless steel. Drawing from personal experience, Greg knew most home brewers hated the arduous task of washing and sterilising their bottles before refilling them with beer. Having identified a problem, he saw an excellent opportunity to provide a solution if he could successfully find a way of reusing the post-mix kegs as small keg beer reticulation system for the homebrew market. The pair undertook an extensive research and development process, including consultation with a number of beer reticulation specialists, in an effort to develop a system utilising the small 10 litre kegs. Indeed, many of the beer reticulation specialists consulted said the system either could not, or would not, work. Undeterred, the pair persisted with their research and testing, confident that continued experimentation would eventually provide a solution, discussed next.

From his extensive brewing experience, Greg knew research and development through ongoing experimentation was the key to solving the small keg problems. For example, not only did they have specialised parts custom-made to suit their new reticulation system, but the pair undertook hundreds of hours of experimental testing. Ongoing trial and error was employed, using many hundreds of litres of homebrew beer, to find the most suitable yeast variety and the right gas pressures, until they finally developed a workable system. Furthermore, additional research was required to find the most effective cleaning agent, one that would not only clean and sterilise the keg lines and brewing equipment, but was non-toxic and environmentally friendly. After repeated research and testing, the two friends pioneered one of the first homebrew small keg beer

reticulation systems in Australia. The small keg system not only solved a significant beer handling problem for home brewers, but it created a significant opportunity by tapping into an identified, and rapidly growing, niche market. In brief, having identified a problem which translated to an opportunity, Greg worked collaboratively to undertake ongoing research and development through trial and error to provide a solution to the beer handling problem. With this solution in hand, he now focused on the next considerable growth opportunity: the burgeoning homebrew beer kit market, discussed next.

Tapping into the growth market Following development of the homebrew beer small keg reticulation system, Greg set about commercialising his innovation. Initially he retailed the small keg system from his warehouse distribution centre relying predominantly on word-of-mouth referrals to drive sales; however, he did not sell any other homebrew beer supplies. After repeated enquiries for additional homebrew beer supplies from customers purchasing the small keg systems, he introduced homebrew beer kits, ingredients and associated equipment. True to his entrepreneurial nature, he saw the opportunity to capitalise on the burgeoning growth of the homebrew beer market and evaluated the risks associated with opening a retail outlet to service the sector. Armed with extensive home brewing experience, and with a deep-seated passion for what he describes as a combination of craftsmanship and science, he established the Homebrewers Warehouse in the early 1990s. Focusing specifically on the homebrew beer market, the outlet sold all associated brewing equipment, raw ingredients and a range of pre-packaged homebrew beer kits. It was these pre-packed homebrew kits that presented the next problem for him to solve; which in turn, became an opportunity to capitalise on, discussed next.

One common complaint from pre-packaged homebrew beer kit customers was the inconsistency of the resulting beer they obtained. After thorough investigation and rigorous testing, Greg discovered the inconsistency was caused through deterioration of the ingredients; mostly due to the affects of tropical heat and ageing, particularly with the malt and yeast. Based on his extensive brewing experience, he saw an opportunity to address this problem by having the homebrew beer kits transported from their original source destination in Sydney in refrigerated trucks. Focusing on this specific issue, he implemented an innovative marketing campaign to promote the freshness of the homebrew beer kits he sold. Additionally, the ageing problem was addressed by

having only small quantities of the homebrew beer kits delivered more frequently. As sale volumes of the homebrew beer kits increased, he negotiated a supply chain agreement with a local transport company, and the homebrew beer kit suppliers, to maintain this point of differentiation. In brief, listening to customer feedback combined with personal experience using the products sold, he was able to partially address the inconsistencies associated with the pre-packaged homebrew beer kits. However, some inconsistencies remained and this problem drove him to undertake another large-scale research and development program; to manufacture his own homebrew beer kits, discussed next.

Climatic differences matter As the pre-packaged homebrew beer kits were developed for southern state climatic conditions, a tropical climate contributed to inconsistencies. The aim of Greg's new research and development programme focused on finding a homebrew beer kit suited for tropical climatic conditions. Furthermore, low alcohol, or light strength, beers were also becoming increasingly popular; which presented another emerging opportunity to capitalise upon. For example, instructions which came with the standard homebrew beer kits suggested using an additional one kilogram of normal sugar to obtain an average alcohol content of around 5 per cent Alcohol/Volume (AV). Through repeated experimentation to develop a homebrew beer kit suited to tropical climate conditions, he discovered a formula for light beer. By using a more refined type of sugar, Dextrose, only adding half a kilogram would result in a light strength beer with alcohol content around 3.5 per cent AV. Further experimentation using corn syrup as a substitute for sugar resulted in a light beer with added body and smoothness. However, he continued the R&D process through experimentation with various yeasts to ascertain their appropriateness for North Queensland's sub-tropical climate, while also suiting the small keg system, discussed next.

Customer feedback drove R&D Greg continued to query his southern-based suppliers about developing a homebrew beer kit to cater for North Queensland's sub-tropical climate. Fortuitously, he was told that if his customers wanted customised homebrew beer kits, then he should develop it himself. As a result of this supplier feedback, and following extensive R&D testing, he became the first commercial homebrew retailer to offer a homebrew beer kit tailored specifically for sub-tropical conditions. Further, he successfully developed a light strength homebrew beer kit; in addition to a normal strength homebrew beer kit suitable for the small keg beer reticulation system. This led

to the establishment of the kits being marketed exclusively under a new label: the Diamondback brand. In brief, by listening to customer feedback, both from home brewers and regional homebrew retail outlets, and maintaining an ongoing program of R&D testing, the Diamondback beer kit of North Queensland was created in 1993.

Protecting a brand's reputation and credibility can act as the catalyst for innovation, as was the case with the Diamondback brand. In Greg's own words: 'Homebrew beer is an art form that requires particular skills to maintain consistency', and this is the underlying reason that led to the development of another new brand of homebrew beer kit. A consistency problem first appeared following distribution of the Diamondback homebrew kits to other regional homebrew retail outlets, when for various reasons, unsold stock was returned for a refund. Thus, Greg noticed the kits were often out of date, or showed signs of having been displayed in shop windows, factors which have a detrimental effect on the quality of the final product once it is brewed. Given the Diamondback kits are considered a premium brand, he decided to develop and market another brand of homebrew kit similar to the Diamondback kits. Again, utilising a continual feedback loop from customer's supplied with test samples, further research and development was undertaken. This resulted in another homebrew beer kit more tolerant to aging and adverse storage conditions; achieved by employing slightly altered ingredient ratios and different yeast varieties. The new brand, called the Canecutter range, had no major consistency problems; thus, was used to protect the integrity and quality of the Diamondback brand, discussed next.

The new brand's name is synonymous with the sugar cane growing regional townships; hence, it was very well received in these areas. Importantly, the success of the Canecutter brand allowed him to retail the Diamondback brand exclusively through his own Homebrewers Warehouse outlet. The development of the Canecutter brand proved extremely successful in regional areas, with increasing sales volumes and a loyal following; while simultaneously protecting the reputation of the premium Diamondback brand and without cannibalising sales. In brief, by continually engaging with, and listening to, customers to drive the R&D and testing process, Greg succeeded in developing two distinctly unique homebrew beer kits specifically tailored for sub-tropical climates. Indeed, continual engagement with customers provided another trend identified as an emerging opportunity: home distillation of spirits, discussed next.

Seizing the spirit of opportunity Following legalisation of home distillation of spirits in New Zealand, the process soon started to gain popularity here in Australia. Greg contends that various market forces, particularly from national beer brewing companies and legislation loopholes, helped feed the growing popularity for home distillation. For example, a major Australian commercial brewery became a majority shareholder in the company importing the home distillation products; which Greg suspects, was to drive down sales of homebrew beer kits. He perceived this potential threat to the homebrew beer market as another opportunity for expanding the range of products and services offered by his Homebrewers Warehouse. Indeed, one of the oft quoted attributes of an entrepreneur is they see little difference between obstacles and opportunities, and utilise their risk taking ability to turn both to their advantage. Weighing up the potential risk posed by home distillation sales cannibalising the homebrew beer market, he nonetheless saw an opportunity of capitalising on this burgeoning market. In brief, reasoning that one market reduction would be offset through new market gains, his gut instinct again proved right as sales in the home distillation product range increased, with negligible loss in the homebrew beer market because of different customer preferences. Subsequently, this situation led to the development of his next product innovation, a home distillation rum kit, discussed next.

Based on significant increases in sales volumes of the home distillation products, Greg undertook a new programme of product R&D, focusing now on home distillation kits. This was a radical innovation approach to product development. It entails proactive action involving high levels of risk-taking towards new product development; whereby, the product is aimed at new customers and and/or new customer needs (Verhees, Meulenberg, & Pennings, 2010). Further, Greg firmly believes an imperative to excellent customer and after-sales service is to provide informed professional advice, particularly in the homebrew beer market. Similar advice was going to be just as important for the home distillation market. Subsequently, he concentrated his efforts on the new product R&D programme on spirits distillation to not only himself educate, but to provide hands-on, evidence-based, advice to his new customer base. Again, high level customer engagement was integral for driving the new product development process, discussed next.

Typical of the entrepreneurial archetype, Greg regularly engaged with his customers to help drive the new product development process. For example, after consulting with

customers he experimented with fermenting different types of sugars and grains, and tested various makes and models of distillation equipment. Indeed, his passion for new product innovation is a hallmark of high-level innovativeness, argues Hadjimanolis (2000) and Mosey (2005); whereby, the owner and/or manager is often the driving force behind the development of most new-to-market products and/or services. The trial and error experimentation procedures yielded substantial amounts of useful information; whereby, this knowledge was used for the development of a new home distillation rum kit, marketed under the Canecutter brand name. Indeed, customer feedback on the resulting spirit obtained from the home distillation rum kit was extremely positive. In brief, engaging with customers for product development process also spurred the generation of new knowledge and expertise in the emerging home distillation market; which in turn, led to the development of the Canecutters Rum kit. Indeed, the reputation and quality of the Canecutter Rum became so well-known that another opportunity emerged to increase the sales volume of the home distillation kits: selling them online, discussed next.

Establishing a virtual shopfront A majority of modern businesses know that one avenue to increase sales and market share is the establishment of an online website. Therefore, Greg identified potential for an online website to increase sales Australia wide of his home distillation rum kits; in addition to providing advice and share knowledge for both the homebrew beer and home distillation markets. For example, Townsville has a large itinerant population of defence force personnel who get transferred every two years, yet they still wanted to purchase Greg's homebrew beer and home distillation rum kits. After an outlay of over $10,000 to established a website, these relocated customers were able to remain in contact with the Homebrewers Warehouse cheaply and conveniently. Initially, customers were only able to purchase the Canecutter Rum kit over the website; however, the product range available was incrementally expanded, discussed next.

Further, establishing the website demonstrated the potential for not only selling the Canecutter Rum kits, but a whole range of other associated homebrew products. However, the early development and integration stages of the website encountered several problems, leading to its shutdown for several months. Redevelopment of the site subsequently enabled it to become a virtual retail outlet for the entire homebrew product range. The introduction of the website as a retail channel improved the

Homebrewers Warehouse's market exposure and geographical reach, leading to substantial sales volume increases. To support the redevelopment of the website an upgrade of current warehouse infrastructure, and the implementation of improved operational and stock control procedures, were required to cater for the increased sales volumes. In brief, the establishment of a virtual shopfront allowed the Homebrewers Warehouse to service existing customers who had been transferred around Australia; while also enabling the outlet to improve its market exposure and expand their customer reach geographically. Next, a summary of Greg's innovative activities is discussed

5.3.3 Homebrewers Warehouse summary

In summary, Greg is reluctant to identify himself as an innovator and entrepreneur; albeit, his business activities over 25 years indicate he actually is. He has consistently demonstrated true entrepreneurial spirit such: as a dynamic owner manager (Hadjimanolis, 2000); proved himself to be a continual innovator through new product development (Mosey, 2005); takes risks with radical product innovation (Verhees, et al., 2010); and, participates in customer research partnerships (von Hipple, 1988). For example, he undertook extensive R&D towards the successful commercialisation of the small keg system for the homebrew beer market; in addition to the development of homebrew beer kits, the Diamondback and Canecutter brands. He has intuitively identified several market opportunities, including a potential threat he turned into an opportunity, developing them into successful and profitable business ventures.

Importantly, he is adamant his business decisions were based primarily on intuition, or gut instinct, eschewing the use of written or formal business plans. Nonetheless, he advocates continual customer engagement seeking feedback to improve service delivery levels, and to 'make sure I'm heading in the right direction'. He is methodical in his approach to problem solving, an approach underpinned by systematic R&D skills coupled with regular market testing via customer engagement to acquire feedback. His personal interests and passions have helped feed into, and develop, potential niche markets such as with the specialised motorbike racing oils and homebrew beer kits. Significantly, his passion for R&D of homebrew beer kits not only inspired the development of two brands, but has also garnered an authoritative reputation through numerous beer brewing accolades including several national awards. Greg Young

epitomises what it means to be an entrepreneur, whilst demonstrating a truly innovative mindset through employing both radical and incremental innovation process techniques.

5.4 CASE STUDY 3: AUSTIN GLASS

The final case study involves a manufacturing and services business which has been in operation for over 25 years. The driving force behind this business is a man who, like the previous case studies, has no formal business qualifications from higher education institutions. His business acumen has been acquired entirely from hands-on experience within various industry sectors. The owner of Austin Glass, Dan Hughes, has not only demonstrated high levels of innovative capability during three decades of business ownership; but has demonstrated an entrepreneurial spirit by being involved in several business ventures during his working life. Subsequently, comprehensive coverage of such an extensive career is beyond the scope of this case study. Nevertheless, a condensed insight into the innovative approach Dan has applied throughout his working life is examined, starting with his entry into the world of business, discussed next.

5.3.1 Business Background

A career path spanning almost 50 years, Dan Hughes's working life started as a clerk with the Queensland government insurance office following completion of Year 10. Several years later he relocated to Townsville in a similar role, before taking up a position as Sales Manager with a national insurance company in the early 1970s. It was during this time with the insurance company that his entrepreneurial spirit first started to emerge by setting up an insurance brokerage firm. Through personal admission, he says this venture was unsuccessful for a number of reasons which include: a lack of funding; lack of experience; a limited depth of business knowledge; and, a lack of what he referred to as business maturity. Completely undeterred by the failure of this first venture, he had experienced both the highs and lows of business ownership, which set him on the path of entrepreneurship, discussed next.

Not one to be put off by what he considered a minor setback, Dan subsequently started a handyman business offering general home repairs and maintenance services. As the client base for this business grew, an increasing amount of the jobs were related to glass repair work, at a time when new aluminium windows were becoming increasingly popular. This observation focused his interest on the opportunities becoming available within the glass industry. Realising he could capitalise on this growing opportunity, he

set about starting his own class company located in the outskirts of Brisbane. After successfully building and running the glass company for five years another opportunity arose, which resulted in him selling the business. According to Zimmerer and Scarborough (2005), for example,hallmark sign of a true entrepreneur is their inherent ability to adapt; whether that be to the constantly changing demands of their customers, or to the changes within their business and operating environments. In brief, by starting several businesses to capitalise on observed opportunities, Dan demonstrated the hallmarks of an entrepreneur: qualities he further developed early in his working life, discussed next.

5.3.2 The entrepreneur ship sets sail

Having already started three separate businesses during his 20s, Dan seized the opportunity to gain experience in another industry sector. This opportunity came from friends who were involved in the hospitality industry, running hotels for a major brewery; an experience that appealed to Dan's sense of adventure. However, his management foray into hotels only lasted a few years, as he explains: 'It wasn't for me, I got bored with the management side and spent most of my time renovating the buildings, because at least I could quickly see that things were being done'. He subsequently re-established the handyman business, this time specialising in glass replacement services for two years; until it evolved into another glass company, Austin Glass, now operating for over 25 years. However, his penchant for innovation did not end as other new businesses were started, discussed next.

Following the establishment of Austin Glass, Dan also started a real estate company; whereby, he provided the financial backing with the business operated by a partner. Additionally, he also established a picture framing business, an adjunct to Austin Glass which offered an alternative outlet for the retail sales of cut glass. Both businesses where eventually sold to provide capital investment to expand Austin Glass. However, some of his other his new venture start-ups were not simply limited to business, as he turned some of his personal hobbies and passions into income generating ventures. He did this by working as a paid pianist, while also purchasing a plane which he operated as a charter service on weekends. In brief, Dan demonstrates a long-standing entrepreneurial streak which continues to this day; whereas, his passion for the glass

industry has remained a continuous thread right throughout his working life, discussed next.

Synthesising the known attributes, personal traits and skills which identify an entrepreneur, Dan's actions and attitude are demonstrative of entrepreneurial talent. However, similar to defining innovation, there is little universal agreement as to what factors actually defines entrepreneurship (Schaper & Volery, 2004). Schaper and Volery (2004) postulate, for example, that entrepreneurship is underpinned by the linking of two interdependent phenomena: the first being the presence of lucrative opportunities; while the second requires the presence of individuals with an enterprising nature. In contrast, when questioned whether he considered himself to be an entrepreneur, Dan replied: 'No, I think of an entrepreneur as someone who is a front man marketer, who is out there and putting schemes together and making them work, who is very good at publicity, has great people skills and all that sort of thing'. Similar to the previous case studies, he did not construe his actions or attitude as being demonstrative of entrepreneurship, or innovation, discussed next

Interestingly, Schaper and Volery (2004) contend that early research into entrepreneurship was centred mainly on who the person was, and what they did. According to Dan, Richard Branson is one notable and highly successful entrepreneur who fits his image of an entrepreneur. Indeed, he expressed surprise when it was suggested that his business approach and personal attitude also constitute entreprenuerial attributes. For example, the constant search and evaluation of new business opportunities, and the subsequent actions to capitalise on these opportunities, are what define him as an entrepreneur. In brief, after almost 40 years of self-employment, having started a number of businesses in different industry sectors, he did not consider himself to be an entrepreneur. Moreover, his passion for the glass industry was not without challenges, and this is where his entrepreneurial spirit is really put to the test, discussed next.

Dealing with changing markets The early days for Austin Glass were ones of substantial profit growth and ongoing success. Because of previous experience with the insurance sector in Townsville, Dan still had an extensive network of contacts within the industry, resulting in the ability to secure almost 80 per cent of the total glass replacement market covered by insurance claims. However, as time passed a number of

new competitors entered the local market, resulting in reduced profit margins while operating overheads increased: the entire glass replacement market was undergoing a shift. These warning signs forced him to reassess the future of the glass market; albeit, he could see only considerable challenges ahead. For example, the old relationships as a preferred supplier were being undermined, and undercut, by new competitors entering the market. Moreover, previous relationships with the major insurance companies were being renegotiated due to the appearance of large real estate franchises. These franchises exerted considerable market power with expansive domestic rental and commercial management portfolios; thereby, putting downward pressure on the profit margins for glass replacement work. Adding to these market forces were workplace regulatory changes, discussed next.

Furthermore, not only was the glass market undergoing major change, but there were increasing compliance, regulatory and operating costs to contend with. These cost were due to the introduction of new workplace health and safety regulations, coupled with regular wage increases and rising operating costs. For example, glass replacement for commercial premises, such as offices and retail outlets, required the work to be done almost immediately. This entailed having staff available 24 hours per day, resulting in extremely high labour costs. Additionally, the cost of raw materials were increasing, as were other standard operating costs such as fuel, electricity, insurance, and leasing payments. Combining all these factors, Dan saw a limited future for profitable continuation within the glass replacement sector; therefore, a big decision was made to research what alternative opportunities may exist within the glass industry for the business to capitalise on. In brief, Austin Glass started operating when a new product, aluminium windows, entered the market and was able to ride the wave of success in glass replacement services for a reasonable period of time. However, waves do not last forever, and so new markets were needed as Austin Glass needed to adopt and adapt - to innovate - to stay viable, discussed next.

A process of adapting and adopting Dan had built a successful business in the glass replacement market, yet a bleak future loomed; therefore, it was time to adapt or die. For example, having taken a proactive approach in building the glass business, he understood the need to build a centre of influence in terms of gaining market share. The business continued to adapt to the changing market conditions, implementing new marketing campaigns and employing sales staff in an effort to regain, or at least

consolidate, some of the lost market share. However, large national competitors started operations in the city, the operating costs continued to raise, and yet the business's profit continued to decline. Thus, he countered this by adopting new technology, for example, such as computer systems to improve adminstrative efficiency levels, and the business continued to operate while searching for a new strategic direction. Finally, just over a decade ago while struggling to maintain market share, Dan decided to abandon their core business activity. He launched the business along the path of new product research and development; where gut instinct prevailed over market research, discussed next.

Realisation the glass replacement market could no longer sustain the business, Dan embarked on a new product R&D programme. Having already embraced new forms of technology, he was increasingly drawn to other emerging technologies within the global marketplace. But technology has many facets according to Dodgson (2000), who contendsit not only encompasses tangible artefacts, but it includes the knowledge that enables the technology to be developed and used in a productive way. For example, Austin Glass's new technology entailed processing their own glass with the purchase of a bevelling machine, with the added benefit they could now process other glass companies work. The machine allowed them to also widen their product range, such as bevelled mirrors, shower screens and tabletops. Increasing the product range available allowed them to source new customers within their local market. Additionally, the new product range enabled them to supply glass to cabinet makers, bathroom installers and kitchen manufacturers; while also providing establishing a retail service for the home handyman and hobbyists. In brief, adopting new technologies allowed the business to enter new markets sectors, in addition to servicing the needs of their competitors. However, the building they leased was sold forcing them to relocate; consequently, this provided the impetus for another search for new opportunities, this time focusing on the construction industry, discussed next.

Constructing new opportunities An inate ability of the entrepreneure is to turn an obstacle into an opportunity, which is just what Austin Glass did. Dan used their relocation into larger factory premises to identify new opportunities in the construction industry: the increasing use of toughened glass. Entry into this specialised market required the purchase of a furnace, enabling them to process standard glass panels into toughened glass. Significantly, this decision meant taking considerable financial risk,

involving a capital investment of approximately half a million dollars. He felt the furnace would consolidate the business's profitability over the longer term, as it was the only glass toughening furnace available in the region at that time. So confident was Dan in obtaining finance for the furnace that he tendered for several large contracts to supply toughened glass with major construction projects. While several minor issues contributed to delays in securing the finance, the furnace was successfully installed and they completed their supply contracts on time. Nonetheless, more unexpected challenges lay ahead, which called upon all his reserves of entrepreneurial perseverance and passion, discussed next.

With the furnace operating successfully, two further unexpected challenges appeared, threatening the entire business: the global financial crisis and a new competitor. Firstly, the global financial crisis severely restricted access to capital for operating and expansion. Secondly, during the long period of constructing and installing the furnace, a new competitor was simultaneously installing their own glass toughening furnace. Undeterred by these hurdles, and heartened by the fact they had successfully won three of several major tenders submitted, they continued to work at becoming a major supplier of toughened glass. For example, after completing installation of the furnace, they began supplying material for a major construction project in Cairns. This provided immediate cash flow, a partial return on the furnace investment, in addition to boosting their confidence and their glass toughening capabilities and experience. Another major contract followed, further boosting their knowledge and expertise in toughened glass; whilst additionally providing a solid financial return on the capital investment. In brief, the early supply contract successes confirmed the initial decision to invest significant capital in the furnace had been the right one, even though it was a decision based on gut instinct rather than market research. The market for toughened glass in the construction industry appeared both lucrative and growing; nevertheless, challenging conditions for all businesses were about to hit: the global financial crisis, discussed next.

The global financial crisis bites Deteriorating market conditions associated with the global financial crisis meant their early success with toughened glass was short-lived. Further exacerbating the situation, there were now three glass companies with furnaces supplying toughened glass in the region; while the full impact of the global financial crisis was starting to severely contract the construction industry. Moreover, a major contract they had won experienced significant cost overruns, and considerable project

delays; thus, they barely broke even, and this at a time when access to further operating capital had completely stopped. Finally, having completed all their major construction contracts, and with the commercial construction industry at a standstill, it was only smaller customers that kept the work coming in. For example, businesses such as; cabinet makers, shopfitters, small domestic builders, small shopping centres and several small supply contracts enabled them to survive; however, this was not sustainable over the longer term due to the high operating overheads. The furnace was costly to run under normal operating conditions; but significantly, it was even more costly to shut down and restart, so it effectively needed to be operating to maximise its efficiency, discussed next.

Importantly, to make the toughening furnace pay its way, and to maximise its efficiency, requires large volumes of glass to be processed. However, the only companies that would take such volumes of toughened glass were large window manufacturers, and they had stopped buying because of the significant downturn in the construction industry. Then a short-term opportunity presented itself with a supply contract covering a six-month operating period. A large window manufacturer offered a contract for large volumes of toughened glass; albeit, at a considerably reduced profit margin with the contract shared between Austin Glass and a major competitor. Unfortunately, the window manufacturer subsequently rescinded the contract after negotiating a deal with a leading national supplier they had previously dealt with. In brief, the global financial crisis caused profit margins to become extremely thin because the commercial construction industry had stalled, while the business was haemorrhaging operating capital because of increased operating overheads. Committing himself to a more extensive search for another new product innovation, Dan then invented an extruded aluminium adapter for retrofitting insulated glass units (IGUs), discussed next.

Innovation through invention In contrast to the profitable days when the business started, a major new product innovation was needed to ensure the business would survive. Dan succeeded in this ambition by inventing a series of extruded aluminium adapters that allowed the installation of highly energy efficient IGUs, commonly known as double-glazed windows, into a building's existing window frames. However, as with many great inventions with substantial financial potential, he still faced the massive challenge of securing financial backing for commercialisation of the invention: a figure

he calculated to be approximately $450,000. The initial R&D process undertaken was relatively simple; whereby, he identified several energy efficiency problems within the glass and construction industry, such as internal temperature loss through windows, and set about devising solutions for them. With the cost of electricity for building heating and cooling constantly increasing, and the wider community becoming more aware about energy efficient buildings, he felt the new innovation provided a cost effective solution. How his new innovation addressed this problem is discussed next.

The unique competitive advantage of the innovative adapters was they enabled the retrofitting of IGUs into almost all types of existing windows frames. The environmental benefits of the new innovative window system were twofold. Firstly, the IGU's reduced the energy consumption for heating and cooling, both in domestic and commercial buildings, through their efficient insulation properties. Secondly, the IGUs have excellent noise attenuation properties, making them highly effective at reducing external noise levels. In brief, Dan was confident he had invented an innovative product that reduced energy consumption in existing buildings at a cost effective rate; hence, it held enormous potential financial gain for the future of his business. Nonetheless, the business was still required to generate normal operating capital, in addition to financing the first stage of the commercialisation process; thus, the major challenge was sourcing investment capital, discussed next.

Sourcing investment capital Initially, Dan sought professional venture capitalist advice to finance the commercialisation process of his innovative window adapter system. Following this advice, he outlaid several thousand dollars to have investment prospectus brochures printed and distributed to major venture capital firms and wealthy investors. These solicitations were followed up with personal investor meetings (L. T. Wright & Nancarrow, 2001), yet unfortunately, not one dollar was raised. Undeterred by this setback, Dan went through his list of former and current business contacts, and arranged meetings to share the vision, and financial potential, of his new innovation (L. T. Wright & Nancarrow, 2001). With simply his story to tell, and the passionate belief in his innovation, Dan was able to raise $400,000, with each investor contributing $50,000. The money covered the business's operating capital for the duration of the two year R&D process, including several trips to China to purchase the necessary parts to build the machine required, discussed next.

To proceed with the full commercialisation of the window adapter system necessitated purchasing a specialised machine costing approximately $300,000. In a show of ingenuity and engineering know-how, Dan was able build his own machine with just over $50,000 worth of parts. For example, after comprehensively researching the type of machine required, he then proceeded find out how exactly the machine worked. Upon completing this task, he then travelled to China to source, and import, the required parts before building the machine with the help of his son and staff. The first stage of the commercialisation process took almost two years to complete, during which time he applied for a provisional patent to protect the intellectual property of his invention. The second stage of the commercialisation process for the new innovation proved just as expensive and lengthy as the first stage, necessitating that it also be undertaken in stages. In brief, from an innovative idea first conceived in late 2008 through to mid 2011, Dan's entrepreneurial spirit, personal passion, and dogged perseverance had turned his innovation into a commercial reality. However, in order to realise the enormous financial potential gains he needed take the project to the next level: selling the benefits of the commercialisation process to the market, discussed next.

Energy and cost efficient Double glazed windows have been in existence since the 1930s, so why did Dan seek to commercialise the innovative window adapter system he had developed? The answer can be found in a quote by Peter Drucker (1994) who asserts: ‘Equally, whatever changes the wealth producing potential of already existing resources constitutes innovation’ (p. 27). While double glazed windows have never really been popular in Australia, they are mandated by the government to be fitted into all new buildings in the United Kingdom. It is only recently, with growing community awareness about energy efficient buildings, that their benefits are being recognised. For example, completely replacing existing standard windows with double glazed windows is extremely expensive, because the entire window frame and glass require replacement. Moreover, because the innovation is retrofitted into most existing windows, with an estimate of approximately 100,000,000 domestic and commercial windows in Australia alone, the market potential is enormous (Chaston, 1997). In brief, there is certainly a potential market in Australia for more energy efficient window systems, but commercialisation of new innovations can take time to gather market acceptance. Thus,

with his innovation now branded as the Silent Window System, Dan embarked on indentifying and building a market for his product, discussed next.

Understanding marketing processes With growing community awareness concerning energy efficiency, Dan believed his innovation would be readily accepted by the market. He created a broad-based marketing campaign for the Silent Window System using mass media channels; however, the campaign was a complete failure (O'Dwyer, et al., 2009). This failure can be attributed to a lack of marketing knowledgecontend Frederick, Kuratko, and Hodgetts (2006), whereoften entrepreneurspossess little knowledge or understanding of their market, and even attempt to launch new products, services or business ventures without any market intelligence. In brief, because of the product's ability for retrofitting into most existing window frames, Dan felt confident of capitalising on the increased community awareness towards creating energy efficient buildings. Indeed, there was also talk within the Queensland state government for the legislation of noise attenuation corridors in high volume traffic areas; whereby, noise abatement is another benefit of double-glazed windows, discussed next.

Furthermore, Dan believed the additional benefit of the Silent Window System for attenuating external noise would also generate substantial market interest. Such interest would be particularly strong from domestic and commercial buildings located near high volume traffic thoroughfares and airports. However, Australia was still feeling the effects of the global financial crisis, where discretionary spending had been considerably reigned in. An important issue of concern undermining the marketing strategy is that no market research was undertaken to either identify what factors were important to the potential customer, or who those customers were. In brief, after spending tens of thousand of dollars on mass media advertising over an 18 month period, not one sale was made. Therefore, Dan conceded assistance was required with the final stage of commercialising his Silent Window System, discussed next.

Learning from mistakes A potentially flawed entrepreneurial attribute concerning marketing is 'learning how to manage the risk of misjudgements' argues Frederick et al (2006, p. 200). And so it was in Dan's case. Previously, his network of industry contacts, his well developed business acumen, his entrenched entrepreneurial spirit, and trusting his gut instinct had served him well in making business decision (Matzler, et al., 2007): but not this time. His lack of marketing expertise (Chaston, 1997), combined

with a misreading of market conditions (O'Dwyer, et al., 2009), put the final stage of the commercialisation process in jeopardy. However, without undertaking any formal market research to substantiate this market potential, the market remained simply that: potential. With the entire future of the business resting on the full commercialisation of the Silent Window System, it was time to engage some outside marketing expertise, discussed next

While many entrepreneurs are good at many things, they are not necessarily good at everything, and strategic marketing was one area Dan had little expertise in. Subsequently, he engaged the services of a marketing specialist to comprehensively restructure the strategic marketing campaign. This involved: researching the market; identifying and segmenting market sectors; rebranding the product; redesigning promotional material; establishing connections with government departments; facilitating network contacts; and finally, investigating establishment of a licensing arrangement with interstate vendors. Part of the restricting process was predicated on the federal, state and local governments all looking to make operating cost efficiency improvements with all their buildings. Indeed, there was even inferred potential for IGU windows to be mandated for all new government buildings in the future, similar to the United Kingdom. In brief, knowledge and an intimate understanding of the potential market is essential for successfully commercialising new products; a process involving comprehensive market research, market testing and strategy development. However, these important marketing aspects were sadly overlooked by Dan as he was blinded by his entrepreneurial enthusiasm.

5.4.3 Austin Glass summary

In summary, while reluctant to acknowledge it, Dan's actions and attitude exemplifies the characteristics typical of an entrepreneur and innovator. For example, he has started multiple business ventures, he exhibits a passion for pursuing business opportunities, and he maintains a strong sense of self-belief (Frederick, et al., 2006; Schaper & Volery, 2004). Just as Drucker (1994) argues that exploiting changeis the hallmark of successful innovations, Dan's long-term association with the glass industry demonstrated he could see changes towards greater energy efficiency in window technology, and his innovation aimed to exploit this change. Indeed, he astutely

recognised his business services, and product offering, needed to change and adapt to altered market conditions, discussed next

Further, Dan actively sought out new opportunities to capitalise on changing business conditions he identified, and he did this through innovation. For example, the Silent Window System aims to capitalise on the emerging trend for greater energy efficiency in both commercial and domestic building window technology. Similar to the previous case studies, he acted mainly on gut instinct, simply doing what he felt needed to be done to maintain the competitive advantage of his businesses. However, he did acknowledge the need for strong commitment to what he described as informal R&D processes; whereas, at the end of the research he still preferred to trust his gut instinct. To his credit, he also recognised that his skills and knowledge in the area of strategic marketing were not capable of driving the final stage of the commercialisation process for his innovation, so he brought in outside expertise. In brief, Dan is one of many small business operators who remain the unsung heroes of the Australian business environment. Essentially, such entrepreneurs are the lifeblood, and the engineers, that fuel the nation's economy. Next, the similarities and differences observed between the three case studies are discussed.

5.5 SIMILARITIES AND DIFFERENCES

This section discusses the similarities and differences that exist between the three case studies examined. Notably, each of the businesses interviewed operated in different industry sectors; tourism/accommodation, wholesale/retail and manufacturing/services. Two of the businesses had been operating for over two decades; whereas, the third was a well-established business, but had only been purchased by the current operators in the last four years. There are many similarities in the way each business operates such as; strong marketing orientation, trusting gut instinct, and the desire to maintain competitive advantage. There are also various differences which include; their approach to R&D, the use of customer feedback loops, and their approach to customer engagement. These similarities and differences are detailed in a comparative table in the conclusion section of the chapter. Nonetheless, several of the more important similarities and differences observed such as: approach to problem-solving; market orientation; entrepreneurial traits and personal attitudes; strategic orientation; and, use of incremental versus radical innovation require closer examination. In brief, none of

the operators considered themselves to be innovators or entrepreneurs; yet they all strove to differentiate their businesses through innovative marketing initiatives or new product developments. The similarity of using a gut instinct approach towards problem solving is discussed next.

5.5.1 Using gut instinct in decision making

An observed similarity between the three businesses is their reliance on gut instinct to assist with decision making, particularly decisions concerned problem solving. Otherwise known as intuitive decision making (Matzler, et al., 2007), it is a process where the operator makes decisions based on a combination of personal knowledge, experience and emotion. Intuitively, they trust their own judgement to know, or to do, what they believe will achieve the best results. According to Matzler et al (2007), gut instinct is routinely associated with radical innovation decision making, for example, typified by the new product and service developments undertaken by each of the three businesses examined. While each business engaged in differing levels of customer engagement and market research to help inform their decisions, all admitted the final decisions were primarily made base on gut instinct, or what felt like the right thing to do for the business. There was also an element of opportunism involved, where they had devised solutions to identified problems that created an opportunity to value add, discussed next.

While gut instinct played an instrumental role in the decision making process, each business was very adept at creating innovative solutions to identified problems. For example, Steve and Maxine addressed a community social responsibility issue (Scones and tea mornings, community club meal nights); Greg addressed homebrew beer kit consistency problems (Diamondback and Canecutter homebrew beer kits, small keg beer reticulation system); while Dan addressed a building energy efficiency problem (Silent Window Systems). Indeed, the latter two case studies undertook radical new product development, but with vastly different approaches. Much of Greg's final product and marketing activities were based using feedback obtained through regular customer engagement; whereas, Dan's innovation was primarily based on what he thought would work best. In contrast, the first case study, while still relying predominately on gut instinct to develop their informal strategy plan, undertook a process of incremental innovation facilitated through customer and community

engagement. In brief, each case study similarly relied on gut instinct, or intuitive decision making, to formulate their approach to solving problems and creating innovation, particularly in the area of new product development and service improvement. However, their actual approach to R&D activities where substantially different, discussed next.

Approach to R&D One significant difference between the case studies was their different approaches to research and development activities. While each business relied on relatively high levels of intuitive decision making, or gut instinct (Matzler, et al., 2007), to guide innovation process activities; two also incorporated various forms of customer feedback loops to help inform their decisions. For example, the Homebrewers Warehouse used a continuous customer feedback loop during extensive new product R&D programmes, achieved by handing out free beer samples from R&D experiments to customers (Sylvie Laforet & Tann, 2006). Further, the Tourist Park used a holistic customer and community engagement approach (Cooke & Wills, 1999) to help improve their service delivery, implementing a range of marketing initiatives to gain first-mover-advantage. The subsequent word-of-mouth promotion generated from their marketing initiatives was completely unplanned, yet it consolidated their reputation as a socially responsible business (Cooke & Wills, 1999; Mankelow, 2008). However, the third case study relied solely on a problem solving approach using personal experience and industry knowledge to drive its R&D programmes, discussed next.

In contrast to the first two case studies, Austin Glass undertook a problem solving approach to identify a niche market for new product development. Dan relied purely on industry knowledge and experience to finalise the product development without any customer feedback. There are four main differences observed between the how the businesses focused on R&D activities to drive innovation processes. (1) Two undertook radical innovation for new product (2) One used incremental innovation for service improvements (3) Two incorporated customer feedback loops (4) One relied only on personal experience and industry knowledge. In brief, similarities between the case studies included having informal plans for their R&D programmes and marketing initiatives; while they all relied on gut instinct, or intuition, for final decisions. Next, the market orientation levels of each business are discussed.

Market Orientation The construct of absorptive capacity is well-known for assisting small business learning, a process intrinsically linked through market orientation (Keskin, 2006). Absorptive capacity is about building a knowledge base from both external and internal sources to drive the development of innovation capabilities (Cohen & Levinthal, 1990; C. Gray, 2006; C. Jones, 2004). Similarly, Keskin (2006) argues market orientation positively influences a business's ability towards learning capabilities; thereby, positively affecting their innovation capabilities. Two of the three case studies demonstrated high levels of market orientation ability. Their marketing orientated activities, predominantly based around customer engagement, positively assisted with the development and acquisition of new knowledge, that was then used in the advancement of their innovation capabilities. Thus, customer feedback loops was essential for two of the businesses; but new knowledge can also be developed from other businesses or industries, with the different approaches taken by the case studies discussed next.

While von Hipple's (1988) research shows the benefits of user, or customer, driven innovation, new ideas can also come from other businesses or within the business itself. For example, the Tourist Park and the Homebrewers Warehouse demonstrated a strong commitment to using continuous customer feedback loops for the development and refinement of their services and products (Di Zhang & Bruning, 2011) Alternatively, Austin Glass used business and industry networks to source and develop new knowledge; which was then integrated with Dan's own extensive industry expertise and business experience to drive new product innovation (L. Pittaway, et al., 2004). In brief, while all three businesses acknowledged the importance of building their knowledge levels to meet changing market conditions and customer demands. However, each achieved their aims through various market orientation approaches by using a combination of: customer feedback loops; business and industry network contacts; and personal knowledge and experience. All the operators exhibited many of the traits and personal attributes associated with entrepreneurs, discussed next.

Entrepreneurial personalities The empirical links between entrepreneurship and innovation was first researched and established by Joseph Schumpeter. Today the two terms are virtually synonymous with each other. Moreover, categorical definitions of each still remain elusive because of the multi-dimensional nature of both terms; however, there are common traits and personal attributes applied to define an

entrepreneur. For example, Kickul and Gundry (2002) propose a set of personality traits conducive to the formation of various innovation processes. Two of the main traits identified are a proactive personality, and an attitudinal construct devised by Miles and Snow known as the prospector strategy. Attitudes associated with this construct include; a strong internal locus of control, risk-taking, seizing opportunities, and being 'independent thinkers who dare to be different' (Drucker, 1994; Frederick, et al., 2006, p. 26). A number of these traits are evident in all the case study operators, discussed next.

Furthermore, there are several substantial similarities, and some differences, between entrepreneurial traits observed in all the operators. For example, they all exhibited various levels of risk-taking propensity, with proactive personalities adept at scanning environments, identifying, and seizing opportunities. In contrast, their attitude towards the prospector strategy differed in approach and implementation, such as their levels of customer engagement to acquire feedback. Albeit, they all had a similar objective for being 'creators of change' (Jill Kickul & Lisa K. Gundry, 2002, p. 87). In brief, all the operators demonstrated numerous entrepreneurial characteristics; thereby, giving them a strong predilection towards innovation process behaviour and activities designed to acquire new knowledge. Indeed, these entrepreneurial characteristics appeared to influence the type of innovation they were involved in, discussed next.

Innovating for competitive advantage One of the primary aims for a majority of small businesses in a competitive market is to achieve, and maintain, a competitive advantage (R. E. Wright, Palmer, & Perkins, 2005). Thus, with several direct competitors in each of their specific industry sectors, each of the three case studies engaged in different innovation activities to attain their competitive advantage. For example, in the case of the Tourist Park there are two competing caravan parks, another located 16 km outside the city, in addition to numerous motels and hotels all competing for the accommodation and tourism dollar. Because of this competition, Maxine and Steve developed innovative marketing initiatives for two purposes: firstly, to differentiate themselves from their competition; and secondly, to ensure they were able to maintain their competitive advantage. Indeed, the innovative marketing initiatives led to substantial differentiation and advantages, as proposed by Wright et al (2005), who argue small businesses can 'gain first mover advantages...create markets and customers...or more effectively differentiate' (p. 33) themselves from their competitors.

However, even though the marketing initiatives they developed appeared radical in nature, the actual implementation was more attuned to incremental innovation. The overall objective was to improve their service offering, while differentiating the business from their competitors. In contrast, the other two case studies were involved with radical innovation, discussed next.

Many small businesses have an open mind to innovation, supported by an entrepreneurial propensity towards risk-taking and pro-activeness (Verhees, et al., 2010). This was demonstrated by Greg who ascertained, through customer feedback, growing market potential for a homebrew beer kit developed specifically for sub-tropical conditions. Seizing the opportunity to gain first mover advantage, he undertook radical new product development to capitalise on this opportunity, resulting in the Diamondback and Canecutter homebrew beer kits. Moreover, because of declining market share in the glass industry, Dan investigated alternative market opportunities and searched for solutions to problems within the construction industry (During, 1986); thus, he too engaged in radical new product development. This process ended with a unique invention, and ultimately a provisional patent; thereby, taking the business into the realm of licensing intellectual property rights as an income generating source. In brief, each of the case studies was able to identify opportunities to meet shifting market demands and capitalise on the various opportunities through innovative new products and marketing initiatives; and thereby, consolidating their competitive advantage. Nonetheless, they differed in their strategic approaches to achieving their R&D goals, discussed next.

Customer feedback strategy The strategic approach to R&D activities of two case studies differed in respects of the customer feedback loops employed. The majority of small businesses strive to build high levels of customer satisfaction, exhibiting a strong customer orientation focus. Indeed, 'considerable emphasis is placed on personal relationships in developing a customer base' contends O'Dwyer et al (2009, p. 61). Thus, Greg's actions are demonstrative of this concept through handing out beer samples during the R&D testing phase of his various homebrew kits. This regular customer feedback proved invaluable towards further product development; while additionally providing a beneficial word-of-mouth promotion of the new products before their launch. Alternatively, Maxine and Steve simply shared their ideas via the activities and objectives list, garnering constructive feedback and suggestions, while

generating significant word-of-mouth promotion within the wider community. Even though Dan readily acknowledged the importance customer feedback, he rarely used it; but instead was particularly active with business network activities to source ideas and trends (L. Pittaway, et al., 2004). In brief, two of the businesses saw customer feedback loops as important drivers for guiding new product development and service improvements. Such activity resulted in a broadening of their customer base through word-of-mouth promotion; while their engagement with customers further enhanced overall customer loyalty, discussed next.

Customer engagement builds loyalty Repeat business from loyal customers is a primary objective for small businesses, attainable through proactive customer engagement. For example, both the Tourist Park and the Homebrewers Warehouse engaged with their customers in a form of co-production (Lovelock, Patterson, & Walker, 2007). The Tourist Park was focused on service improvement, whereas the Homebrewers Warehouse focused on new product development. Importantly, two significant benefits, which translate into loyal customers, are derived from customer engagement. Firstly, if customers perceive they are involved in a new product or service development process, they gain a sense of ownership; hence, are more likely to continue using the product or service. Secondly, customers are more likely to become net promoters of the products or services, meaning they actively recommend the product or service to friends, family and colleagues. However, it is not just individual customers that can be engaged with, but entire communities can also become engaged, discussed next.

Furthermore, the Tourist Park used innovative marketing concepts to engage more broadly (D. Cummins, Gilmore, Carson, & O'Donnell, 2000), where they undertook activities that engaged with the entire community (Cooke & Wills, 1999). Through their support of local community groups in their fundraising efforts, they built a reputation for social responsibility (Mankelow, 2008); which in turn, resulted in entire sections of the community becoming net promoters for the Tourist Park. In parallel with this form of community engagement was a direct benefit to the park customers, as they got to find out more about the local community on a more intimate basis. This created a spill-over effect as the park customers now sought out lesser-known city attractions, unique business offerings, and often would extend the length of their stay. In brief, the first two businesses effectively used different forms of customer and community engagement to

establish customer loyalty and broaden their customer base. Finally, the differences and similarities concerning the strategic orientation of each business are discussed next.

Strategic orientation: planned or unplanned Strategic orientation is the ability to build and/or sustain superior business performance through appropriate strategic alignment (Weinzimmer, Michel, & Franczak, 2013). Further, the strategic orientation construct is grounded on the resource-based view (RBV) which states individual businesses have finite resources available (Di Zhang & Bruning, 2011; Weinzimmer, et al., 2013). Thus, all three case studies exhibited high levels of strategic orientation, while conforming to the RBV construct. The three businesses all outlined a long-term, sustainable, view of their business's future, thereby conforming to the accepted perception that a strategic plan covers a three to five year timeframe. Notably, none of the businesses actually developed a formal written plan; which is similar to a majority of small business planning research undertaken (D. J. Cummins, 2005). Even though many small businesses say they have a business plan, most of them are informal, discussed next.

While most small business undertakes some form of planning procedures, the majority of them are informal in almost every aspect. For example, apart from the activities and objectives list developed for display by the Tourist Park, they had no other formalise business plans. Similar to other business constructs, like market orientation and entrepreneurial orientation for example, strategic orientation is defined as a multidimensional construct used to 'determine the right plan' for goals and objectives the business aims to achieve (Weinzimmer, et al., 2013, p. 22). All three businesses were adamant they had developed various plans during their years of operation; however, none of them had formally documented their plans. In brief, the three case studies were similar by exhibiting high levels of strategic orientation, and the use of informal plans to achieve their aims. Nonetheless, they all differed in the approach and implementation of their plans and operating style. Indeed, the different operating styles are perhaps more to do with the differences in the individual personalities, discussed next.

5.6 SUMMARY OF THE CASE STUDIES

This section provides a summary of the case studies, in addition to discussing the assumptions used to determine why these businesses where chosen as highly

innovative. It aims to reiterate the main attributes and characteristics inherent in the three case studies examined, and how these factors were the drivers of innovation processes and outputs, leading to their selection as businesses representative of high levels of innovative capabilities. Further, an overview of the similarities and differences occurring between the businesses is detailed, before concluding with a brief summary of the key points the chapters aimed to achieve. First, the assumptions used to select each business as an innovation case study are discussed.

5.5.1 Selection assumptions

This section outlines the assumptions used to determine why the three businesses selected as case studies were identified as demonstrative of innovative capabilities. Further, innovation characteristics pertaining to why the businesses were deemed representative of their industry sectors is presented; followed with relevant links from the innovation research literature to substantiate why these assumptions were made.

Table 5.1 **Levels of business and personal characteristics and attributes**

Business characteristic or attribute	***Charters Towers Tourist Park***	***The Homebrewers Warehouse***	***Austin Glass***
Market orientation	High	High	Moderate
Strategic orientation	High	High	High
Customer engagement	High	High	Low
New product/service development	High	High	High
Research and development propensity	Moderate	High	High
Networking activity	Low/Moderate	Moderate	High
Sustainable competitiveness	High	High	High
Differentiation strategy	High	Moderate/High	High
Personal characteristic or attribute			
Entrepreneurial	Low	Moderate/High	High
Prospector strategy\Proactive	High	High	High
Risk-taking propensity	Moderate	Moderate	High
Achievement motivation	High	High	High
Intuitive decision making (gut instinct)	Moderate	Moderate/High	High

Firstly, Table 5.1 provides an overview of the business and personal characteristics and attributes associated with innovative businesses. Identified from the research literature, these characteristics and attributes were used to identify the three case studies as representative of highly innovative businesses within their respective industries. Further, a rating system of low/moderate/high was attributed to these characteristics and attributes. Each business reviewed obtains an overall high rating for a majority of the characteristics and attributes; thereby, indicating they possess high levels of innovative capabilities. For example, characteristics and attributes such as strategic orientation, new product/service development, R&D propensity and prospector\proactive strategy all rated high. Following the initial semi-structured interview to collect primary data, the three businesses were assessed as possessing high level innovative capabilities; hence, they were asked to participate in another in-depth interview to discuss their business and innovation processes further. Secondly, Table 5.2 lists these same characteristics and attributes from Table 5.1, but provides a sample of authors from relevant research literature. In brief, each case study demonstrated innovative characteristics and attributes identified from the research literature; thereby, identifying them as ideal candidates representative of typical small businesses to highlight innovative capabilities. An overview of the main similarities and differences between the businesses is discussed next.

Table 5.2 **Business and personal characteristics with supportive research authors**

Business characteristic or attribute	Author names
Market orientation	Di Zhang & Bruning, 2011; Li et al 2008; Chaston, 1997
Strategic orientation	Weinzimmer et al, 2013; Escribá-Esteve et al 2008; Thompson & Gray, 1998; Laforet & Tann, 2006; Berry, 1996; Dodgson, 2000; Brickau, Chaston & Mangles, 1994
Customer engagement	Cummins et al, 2000; Laforet & Tann, 2006; Butler, Le Grice & Reed, 2006; Cooke & Wills, 1999;
New product/service development	Mosey, 2005; Brickau, Chaston & Mangles, 1994; During, 1986
Research and development propensity	Acs & Audretsch, 1988; Bhaskaran, 2004
Networking activity	Laforet & Tann, 2006; Pittaway et al, 2004; Bessant, 1999; Butler, Le Grice & Reed, 2006;
Competitiveness advantage	Abbot, Jeong & Allen, 2006;
Differentiation strategy	Acs & Audretsch, 1988;
Personal characteristic or attribute	
Entrepreneurial	Kickul & Gundry, 2002; Dodgson, 2000; Berry, 1996; Bhaskaran, 2004; Boyle, 1997; Berger-Helmchen, 2009; Di Zhang & Bruning, 2011
Prospector strategy\Proactive	Bhaskaran, 2004; Boyle, 1997; Chaston, 1997; Chen & McQueen, 2008; During, 1986;
Risk-taking propensity	Chen & McQueen, 2008; Di Zhang & Bruning, 2011;
Achievement motivation	Abbot, Jeong & Allen, 2006; Di Zhang & Bruning, 2011
Intuitive decision making (gut instinct)	Forbes, 2005

To assess the similarities and difference between the three case studies, detailed in Table 5.3, a mix of indicator rating scales are employed to demonstrate levels of a characteristic or attribute. The main rating indicator employed involves the terms low/moderate/high to signify the levels, or frequency, of that particular characteristic or attribute. For example, the business characteristic of informal strategic planning indicates all the case studies shared high levels of this characteristic; whereby, they were highly involved in informal strategic planning as opposed to having formally documented strategic plans. Alternatively, the indicators employed for tertiary business education and innovation types are literal representations of these two factors; whereby, neither operator of the latter two case studies had any formal tertiary business qualifications. Further, Greg from The Homebrewers Warehouse used a combination of radical and incremental innovation for the introduction of new products; where the new products were introduced to the market and gradually refined over time using customer feedback. In brief, the three case studies demonstrated more similarities than differences according to the processes, characteristics and attributes which contribute to their high levels of innovative capabilities.

Table 5.3 **Similarities and differences between the three case studies**

Similarities	***Charters Towers Tourist Park***	***The Homebrewer's Warehouse***	***Austin Glass***
Tertiary business education	Limited	None	None
Intuitive decision making (gut instinct)	High	High	High
Informal strategic planning	High	High	High
Prospector strategy	High	High	High
Achievement motivation	High	High	High
New product/service development	High	High	High
R&D activities	Moderate	High	High
Environmental scanning	High	High	High
Competitive advantage	High	High	High
Differentiation strategy	High	Moderate/High	High
Proactiveness	High	High	High
Differences			
Entrepreneurial	Low	Moderate	High
Customer engagement	High	Moderate/High	Low
Customer feedback loops	High	Moderate/High	Low
Risk-taking propensity	Low	Moderate	High
Networking activity	Low/Moderate	Moderate	High
Marketing initiatives	High	Moderate	Low
Innovation type	Incremental	Incremental\Radical	Radical

In summary, the three case studies examined all exhibited high levels of innovative capabilities, and were deemed representative of their various industry sectors. Moreover, the latter two operators possessed strong entrepreneurial attributes, while all three businesses were demonstrative of sustaining competitive advantage attributed to differentiation strategies. The first two businesses demonstrated high levels of market orientation, and kept involved in continuous customer engagement to help focus and guide their product development and service improvement programmes. All three maintained a continuous process of environmental scanning, coupled with a prospector strategy for the sourcing of new ideas, products or processes. The operators all demonstrated various levels of risk-taking propensity through the introduction of new products or marketing initiatives. Indeed, when business challenges arose they were proactive in finding solutions to these problems, and they relied heavily on intuitive decision making, or gut instinct, to decide on a final course of action. Two of the businesses actively sought to provide solutions to identified problems as a way of driving their innovation processes; thereby turning obstacles into opportunities. In brief, these three businesses appeared typical of the regional small business population

generally, demonstrating a willingness to adopt new ideas or processes; and to engage with customers or network with other businesses. In combination, all these activities allowed them to adapt to changing business environments by building on their innovation capabilities, discussed next.

Table 5.4 **Case study comparison against propositional inventory activities**

Propositional activity	***Charters Towers Tourist Park***	***The Homebrewers Warehouse***	***Austin Glass***
P1. Maintain short adoption timeframes	High	High	Moderate
P2. Routine planning and appraisal activities for introduction of new goods and service	High/Formal	High/Informal	High/Informal
P3. Strong focus on strategic and market orientation	High	High	Moderate/High
P4. Continuous improvement of service delivery	High	High	High
P5. Proactively seek customer feedback and act upon it	High	High	Low/Moderate
P6. Continuous improvement of management and operational procedures	High	Moderate	High
P7. Flexible work hours and subsidised training for staff	Moderate	Moderate	Moderate/High
P8. Regular scanning of operating environments (internal and external) to identify new opportunities	High	Moderate/High	High
P9. Establish and maintain links with other businesses through proactive networking	Low/Moderate	Moderate	High
P10. Subscribe to and read industry/trade/research publications as a source for new ideas and trends	Moderate/High	Moderate/High	Moderate

Levels of innovative capabilities This final section compares the three selected case studies in the context of their levels of engagement in the innovative capability building activities listed in the propositional inventory. To facilitate this process in a more simplified way, Table 5.4 lists each of the propositional inventory activities, and compares each of the case study's levels of engagement with these activities using a ranking of low, moderate or high. These rankings are based on their response to the initial face-to-face semi-structured interview, combined with the more detailed answers from the in-depth unstructured follow-up interview that used open-ended questions. To put these levels of activity rankings into context if compared to the use of an equivalent Likert scale, the rankings are as follows: 1 represents low levels of activity; 2 represents low/moderate; 3 represents moderate; 4 represents moderate/high; and, 5 represent high levels of activity. On this basis, Table 5.4 clearly demonstrates that each of the case studies engaged in moderate to high levels of the propositional inventory activities deemed to be essential for building each business's levels of innovative capabilities. For example, a capability is a particular level of competency that becomes part of an embedded routine within the business, or as Siguaw et al (2006) posits, it becomes part

of a systematic process of a holistic value creation approach attributed to innovation outputs and outcomes. In brief, each of the three case studies examined showed a propensity for systematically engaging activities that fostered value creation through innovation, discussed next.

The supporting explanations for each of the propositional inventory activities in section 4.5.1 states that if undertaken on a systematic basis, the activities will help a business build on its innovative capabilities. For example, the more regularly a business engages in a certain activity, the more competent the business becomes at achieving a consistent outcome; which in turn leads to the activity becoming adopted and embedded in the business's operating systems. Alternatively, an activity that does not lead to a satisfactory outcome, or create value, for the business is not adopted; therefore, such activities are not adopted because they do not help a business build its innovative capabilities. Thus, each of the 10 propositional inventory activities has the potential to help a business build on its innovative capabilities through enhancing the competency levels of the business to create value itself, or indirectly for its customers. Each of the case studies engaged in high levels of routine planning and appraisal activities; albeit, two of them used informal planning processes while the third used a combined approach of formal and informal processes. The only proposition not routinely engaged with flexible work hours and subsidised training staff; whereby, this was because two of the businesses employed casual and part-time staff while all businesses only had relatively small staff numbers. Nevertheless, they still acknowledged importance of looking after their staff, and involving and rewarding them in the overall innovation process. In brief, by routinely engaging in the propositional inventory activities, each of the case studies demonstrated the capacity for helping them build on their innovative capabilities. These capabilities enabled them to create more value for their business through new and improved products, greater levels of customer engagement and enhanced their levels of competitive advantage. Next, chapter 6 provides a summary of the preceding chapters, provides answers to the research questions and discusses the overall conclusions.

CHAPTER 6

Conclusions and Discussion

Outline of Chapter 6	
Section	**Content**
6.1	***Introduction*** Highlights the purpose of the thesis. Reiterates the two primary objectives of the thesis, and the substantive contribution made to the current small business innovation knowledge by output of an innovation planning framework specific to small business operating environments.
6.2	***Chapter summaries*** Provides a condensed summary for each chapter's content.
6.3	***Review of research problem and questions*** Re-examines the thesis research problem identified from knowledge gaps that emerged from the literature reviews. Restates the research questions accompanied by substantive conclusions drawn from the research findings.
6.4	***Summary of the overall findings*** Presented in tabulated form, a summary of the research design and the major findings are provided. Concludes with how the thesis outputs contribute to small business operations.
6.5	***Policy implications and future research*** Examines potential policy implications for the small business sector in areas which include: identifying innovative small businesses; re-evaluating innovation assessment criteria; appropriate innovation measure; and combining predictive indicators to form assessment criteria. The importance of future research is discussed next, followed by the need for new research approaches, and concludes with how this thesis lays substantive foundations for future research into small business innovation.
6.6	***Conclusion*** Reiterates the substantive contribution this thesis makes to the small business sector with three practical outputs.

6.1 INTRODUCTION

The purpose of this chapter is to reacquaint the reader with the previous chapters' contents, providing a detailed, yet succinct, summary of the entire research project and its outcomes. Innovation is an incredibly complex research topic, highlighted by the three case studies examined in the previous chapter. For example, all three businesses demonstrated high levels of innovative capabilities in the context of the research findings; however, none would be considered innovative if current innovation proxy measures such as patent counts and R&D expenditure were applied. Hence, this thesis sought to achieve three primary aims encapsulated by two overarching objectives. The primary aims are: firstly, to identify what drives innovation processes in small business environments; secondly, the development of a conceptual model and innovation

planning framework; and lastly, to examine what innovative capability measures or indicators could be developed using the identified drivers.

Moreover, the primary aims are encapsulated within the framework of two overarching objectives. The first objective is to empirically understand how the identified determinants and enablers facilitate innovation processes within small business environments. The second objective is to make a practitioner-usable knowledge contribution to the small business innovation process information currently available. In brief, all the primary aims and objectives were achieved to certain levels. Albeit, the third primary aim and the second objective require further research and testing, preferably through longitudinal studies, to ascertain how the outputs will make a meaningful contribution to small business operations. The processes employed to achieve the stated aims is discussed next.

Primary aim 1 – The innovation drivers To achieve the first aim, a multi-method research design was employed to identify the innovation process drivers in small businesses. For instance, analysis was conducted on a combination of primary and secondary data. The primary data was obtained through 100 semi-structured, in-depth interviews with small business operators in North Queensland; thereby, presenting a relatively narrow, yet still representative, geographic sample. In contrast, the secondary data analysed was collected nationally by the ABS, which presented a far wider geographic sample. Nonetheless, there are several limitations identified in the ABS data, such as the exclusion of micro-businesses with less than five employees. The synthesised findings from these two datasets produced a clear view of what the main innovation drivers are in the context of small business operating environments; thereby, providing solid foundations for the development of primary aim 2 – the thesis outputs, discussed next.

Primary aim 2 – Conceptual model and innovation planning framework The findings from the two datasets contributed to the development of three innovation-centred outputs. The first output is a propositional inventory detailing the main drivers of innovation. A common output from qualitative research (Tan, et al., 2009), the inventory consisted of a series of ten actionable propositions which, if undertaken by a small business, are likely to improve their innovation capabilities. The contents of the propositional inventory then laid the foundation for the second output, development of a

conceptual small business innovation model. Based on three phases, the model starts with the list of actionable propositions leading to innovation outcomes. The second phase is segmented into radical and incremental innovation outcomes and outputs; whereby, the third phase culminates with the positive benefits derived by a business implementing such activities resulting in improved innovative capabilities. Subsequently, the constituent parts of this conceptual model provided the basis of the third output, a small business innovation planning framework. The constituent parts of the conceptual model and the propositional inventory were integrated into the innovation planning framework. The purpose behind the planning framework is firstly, to assist small business operators build on their innovative capabilities; and secondly, to assist them to implement and manage innovation processes in a sustainable way. An iterative three-stage process, the planning framework is similar to the Deming Cycle (J. R. Evans & Lindsay, 1999) involving planning, actions and assessment before repeating the process again. In brief, the three outputs are likely to help small businesses build, and better manage, their innovative capabilities; whereby, the development of specific innovative capability measures should help with the innovation management process, discussed next.

Primary aim 3 – Innovative capability measures The third primary aim was to evaluate if the identified innovation drivers could be developed into innovative capability measures or indicators. The reason for this is because the current proxy innovation measures available – patent counts and R&D expenditure – are inappropriate to most small business circumstances and give no true indication of a business's level of innovative capabilities. As discussed in chapter 2, it is vitally important to ascertain if more appropriate innovation measures are possible for the small business sector. Two steps were required to achieve this; first, the identification of innovation drivers from the two datasets analysed. Second, to evaluate if, and how, these identified innovation drivers could be interlinked to form potential innovative capability measures suited to small business operating environments.

Even though interlinking certain innovation drivers may not actually provide quantitative measurements of innovation process activities, they are useful predictors of innovation-related outcomes and outputs which are indicative of businesses levels of innovative capabilities. For example, short adoption rate timeframes interlinked with

high levels of customer engagement are indicative of high level innovative capabilities. Additionally, continual customer engagement combined with a strong marketing orientation and strategic planning abilities is another potential predictor for building high levels of innovative capabilities. The findings from this thesis demonstrate the aim of developing innovative capability measures or predictors specifically for small business is possible. However, further research and field testing, via longitudinal studies, is needed to validate the veracity and accuracy of the potential innovative capability measures and indicators developed by this thesis.

In summary, this thesis was able to achieve its three primary aims and two overarching objectives. Further testing of the outputs is required to substantiate their efficacy levels. Achieving the first primary aim, by identifying the drivers of small business innovation processes, enabled achievement of the second primary aim by producing three usable outputs. Using the foundations laid through development of a propositional inventory, the two main outputs constructed include a conceptual innovation model, and an innovation planning framework specific for small business operations. The final primary aim to evaluate if the identified drivers could be interlinked to form innovative capability measures for small businesses was achieved. However, the various capability measures and indicators require further research to test their efficacy levels. Next, the knowledge contribution made by this thesis is discussed.

Contributing to current innovation knowledge This thesis makes a substantive knowledge contribution pertaining to Australian regional small business innovation. It does this in three significant ways; firstly, by identifying the major enablers that driver innovation within the context of regional small business environments. Secondly, by the contribution of a conceptual innovation model and an innovation planning framework specifically developed for small businesses. Lastly, by interlinking the identified drivers to form an innovative capability measure and composite indicators, there is potential for them to be developed further as predictors of innovation process outcomes and outputs. Indeed, even with the considerable volume of extant research literature focused on innovation in the small-medium-enterprises sector, substantial knowledge gaps still remain about the actual drivers of activities and processes that enable innovation outputs. This thesis provides substantive empirical support as to what these innovation drivers are; moreover, how small business operators can use these drivers to facilitate

activities and processes that lead to innovation outputs. Thus, in addressing the second objective of producing practitioner-usable knowledge, the conceptual innovation model is constructed with the view to assist small business operators further build on their current innovative capabilities, discussed next.

In today's dynamic business environment small businesses need to be adaptive to constantly changing consumer trends and technology: this conceptual innovation model aims to facilitate this. Importantly, the chapter 2 literature review determined there is widespread belief that small businesses are innovative by their very nature. For instance, their operating flexibility and ability to act quickly on emerging opportunities is assumed to make them innately innovative, yet many are constrained by limited resources (Hadjimanolis, 2000). The primary data findings in chapter 4 demonstrate many small business operators engage in low-cost innovation-related activities; thereby, circumventing certain resource constraints. For example, such activities include regular environmental scanning for new ideas and/or products and processes; in addition, quickly adopting and implementing new ideas and/or products and processes within relatively short timeframes. Further, high levels of customer engagement (including listening to customer feedback) and continual improvement of service delivery are further activities which are low-cost, yet which have extensive potential to rapidly build innovative capabilities. Many of the sample businesses interviewed demonstrated they were intuitively innovative without being hobbled by resource constraints: they appeared to maintain an attitude of making the most from what limited resources they have.

In summary, this thesis has contributed to the current innovation knowledge base with two substantive outputs. The first, using listed activities from the propositional inventory as the foundation, is the development of a conceptual innovation model specific to small business environments. The model holds potential benefits for small businesses by guiding and assisting them to build on their innovative capabilities. Subsequently, this first knowledge contribution fed into the development of the second knowledge contribution, the innovation planning framework, discussed next.

An informal planning framework The second substantive knowledge contribution from this thesis is the development of an innovation planning framework. The benefits to a small business operator of using such a planning framework should enable them to

establish a routine of highly effective innovation management procedures. For example, the finding from the primary data indicates almost two-thirds (65 per cent) of respondents believe planning for the introduction of new, or significantly improved, goods or services to be very to extremely important. A further 50 per cent of respondents believed some form of innovation planning was very to extremely important to the overall success of their business; whereas, only 30 per cent believed formal (written) planning for innovation was very to extremely important. Such findings create a certain disconnect, or disparity, between the ways of planning for new goods and services, discussed next.

There is a disparity between planning innovation activities and the introduction of new goods or services. For example, a majority of respondents (66 per cent) believe innovation is very to extremely important to business success; additionally, 69 per cent believe having innovative goods and services is very to extremely important for the overall success of their business. Consequently, an innovation planning framework specific to small business environments provides a tool for operators to effectively engage in an innovation planning process in a more general way, without committing themselves to more formal planning procedures. An innovation planning framework means it can be suitably modified, and adapted, to suit a variety of business's specific circumstances within different operating environments. Obviously, further research is required to develop a set of small business innovation measures, or predictive indicators, which would be complementary, if not completely essential, for such an innovation planning framework to have maximum effect toward building sustainable innovative capabilities.

In summary, the development of a small business innovation planning framework has made a substantive contribution to the current innovation knowledge base. Given the fast moving and dynamic nature of today's competitive business environment, particularly with the prevalence of internet-based business models, this innovation planning framework will benefit small businesses by allowing them to engage in informal planning for innovation processes. Therefore, the planning framework is seen as a significant tool for assisting small businesses to achieve and maintain a sustainable competitive advantage. Next, a summary of each of the chapter's contents is presented.

6.2 CHAPTER SUMMARIES

The purpose of this section is to provide a brief summary of the thesis chapter contents. It concludes by presenting a simple flowchart summarising the main points from each chapter. The structural review of the chapter contents begins by identifying the research problem, and presents an explanation of the different research methods employed for the literature review. This is followed by examining the methodological approach employed to construct the research design, the analysis techniques applied to the primary data, and an overview of the main findings. The findings facilitated the construction of the thesis outputs: a propositional inventory, a conceptual small business model and an innovation planning framework. Finally, the common innovative characteristics and attributes identified in the three case studies are summarised. Thus, this section condenses and summarises the contents of the chapters to form a brief snapshot of the research undertaken and the subsequent findings and outputs produced, and concludes with a simple flowchart to act as visual road map of each chapter.

- Chapter 1 outlines the research problem, provides background to the overall research, and introduces the research questions developed to address the research problem.
- Chapter 2 discusses the different literature review methods employed, examines the merits of conducting a SLR process, and compares the SLR features with a traditional literature review. It then discusses the overall summary of the SLR findings, examines the wider innovation research parent themes, theories, measures and models before discussing the research information gaps from both the research literature and the ABS survey finding. Finally, inherent problems associated with innovation research are discussed, before concluding with a synthesis of the overall findings from the literature review.
- Chapter 3 provides explanation and justification for the implementation of a mixed methods research design, discusses paradigm selection and its appropriateness, and provides substantiation for the inclusion of the case studies.
- Chapter 4 discusses the mostly non-parametric multivariate analysis techniques employed to analyse the primary data, and examines statistically significant details from the obtained findings. It then describes how these findings facilitated the development of the propositional inventory, the conceptual model and the planning framework before concluding with the potential implications of the findings.

- Chapter 5 examines the three case studies in detail, and highlights the connections between their innovative characteristics and attributes identified in the propositional inventory. The conclusion in chapter 5 discusses the links between the thesis findings and the innovation activities demonstrated in the case studies. Indeed, the conclusion highlights the notion that many small business operators do not consider themselves to be innovative: they are simply trying to maintain a competitive advantage. Importantly, this final point acknowledges the support small businesses provide to the nation's economy; whereas, it simultaneously dispels the preponderant myth that innovation is the essential ingredient for modern business success (Feeny & Rogers, 2001).

To summarise each of the chapter contents, Figure 6.1 provides a simple flowchart of the major topics. Next, the research problem is reviewed and the research questions are answered.

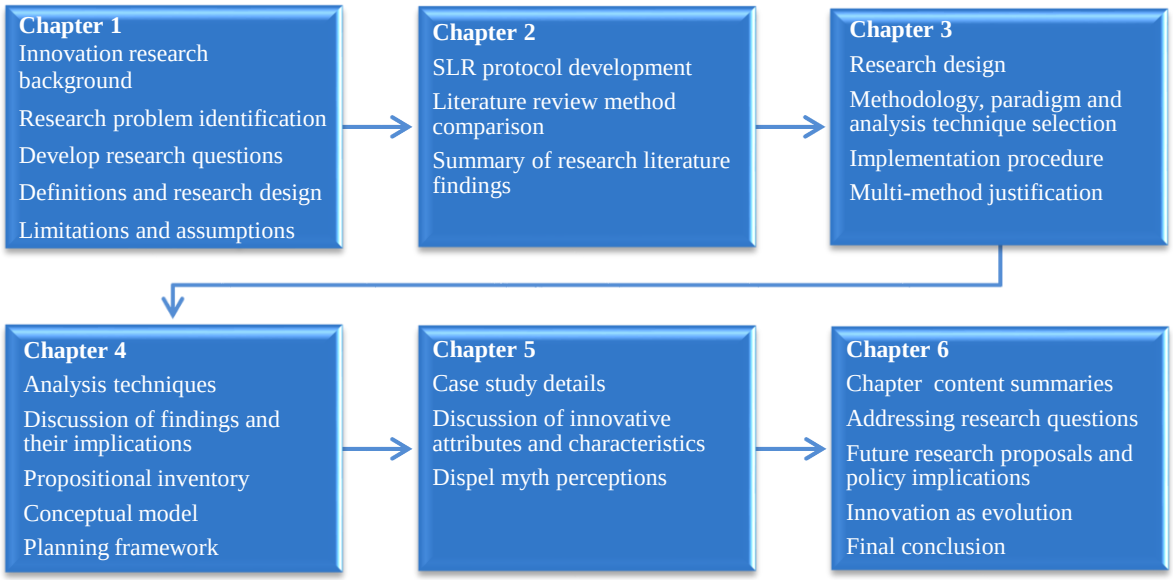


Figure 6.1 **Flowchart summary of the chapter contents**

6.3 REVEIW OF RESEARCH PROBLEM AND QUESTIONS

This section reviews the impetus for this thesis, the research problem, and summarises the answers to each of the four research questions the thesis set out to investigate. Firstly, the focus for the thesis was the identified overarching research problem: what drives small business innovation? Four research questions were developed to address this research problem. The research questions were developed with insights gained from

the main research areas identified within the small business innovation research literature, discussed in chapter 2. Further, chapter 2 also discussed several research issues of concern identified within the extant research literature, discussed next.

Following the initial literature review on small business innovation, a number of issues of concern emerged. These issues include: the need for clear definitions of innovation (E. Rogers, 2003; M. Rogers, 1998); problems associated with financial data collection (Dess & Robinson, 1984; OECD/Eurostat, 2005); and the use of inappropriate innovation measures such as R&D expenditure (Ortega-Argiles, Vivarelli, & Voigt, 2009) and patent counts (Michael & Pearce, 2009). Another significant factor that contributes to building innovation capabilities is also discussed; the importance of adoption rate timeframes. For example, a business's learning ability and innovative capability through absorptive capacity is a key element associated with adoption rate timeframes and the implementation of new products, processes or knowledge (Cohen & Levinthal, 1990). In brief, the introduction chapter provides the foundation topic on which this thesis is built by identifying the research problem. The research problem – what enablers drives regional small business innovation – was identified from a review of the extant research literature discussed in chapter 2; whereby, the research problem was further distilled after taking into consideration the above-mentioned issues of concern. Next, a more detailed summation of the process involved in distilling the research problem is discussed.

Identifying the research problem Even though it may appear obvious, the first crucial step in good research is to correctly identify the research problem. For example, Sekaran (1992) asserts this step, often referred to as identifying the 'broad problem area' (p. 31), enables the researcher to construct a conceptual framework to formulate the research design. Furthermore, by applying the simple questions of 'who, what, where, how, and why' specific to the chosen research topic, as recommended by Babbie (2002) and Tan et al. (2009), the research problem was distilled from reviewing the small business innovation research literature. The research problem identified concerned significant knowledge gaps in two areas: the lack of identified determinants and enablers of innovation in small businesses (Olsen, et al., 2006; M. Rogers, 1998); and the lack of accurate innovation measures specific to small business innovation processes and outputs (Z. J Acs & Audretsch, 1990; Becheikh, et al., 2006; Dodgson &

Hinze, 2001; Jensen & Webster, 2004). Thus, the following research statement was formulated:

What are the enablers (processes, products, procedures, ideas, knowledge and attitudes) of innovation activities within the context of Australian regional small business environments; moreover, once identified, how can these innovation enablers be interlinked to form measures or indicators capable of measuring a business's level of innovative capabilities?

In acknowledging the small business sector is the lifeblood of a nation's economic activity, whereby anecdotal evidence suggests this sector is by its nature highly innovative, finding answers to this specific problem is of considerable importance. Not only will the small business operators benefit through building improved innovative capabilities, but the nation's economy should also benefit from improved productivity rates, more sustainable sectoral growth and lower small business failure rates.

In summary, the research problem of small business innovation concerns specific knowledge gaps identified from the extant research literature. Finding answers to these knowledge gaps, what drives small business innovation and how can it be measured, could improve small business performance overall; and therefore, help to improve the nation's economy. With the research problem identified, the next crucial step was developing the right questions; which in turn, would yield appropriate answers to address the problem, discussed next.

6.3.1 Questions and answers

With the scope of the research narrowed considerably due to clear identification of the research problem, the following four research questions were developed to address this problem. This section reviews each of the research questions, followed with a summary of the findings for each question that addressed the knowledge gaps identified within the research problem.

Q1: What are the enabling factors (activities, products, procedures, ideas, knowledge and attitudes) that drive innovation processes?

Answer: Because of the inherently complex nature of innovation, there are a significant number of determinants and enablers that contributed to the overall innovativeness of

small businesses. However, the activities that are consistently used by a majority of the businesses interviewed to drive innovation-related processes and outputs include:

- the purchase of new equipment or machinery;
- new marketing and promotional campaigns;
- scanning external environments for new ideas and products and/or services;
- short adoption rate timeframes – averaging eight weeks – of new products, processes, ideas or knowledge;
- providing flexible hours for staff training;
- fostering and encouraging employee empowerment; and,
- proactively seeking, and listening to, customer feedback.

Q2: Which of these enablers demonstrate capacity to help a business build innovative capabilities?

Answer: The findings from the primary data remain inconclusive concerning this question as the outputs developed are purely conceptual and remain untested. Further research is required before a clear picture of the potential relationships between the identified enablers of innovative capabilities can be firmly established. Interestingly, the importance of absorptive capacity for building innovative capabilities (Cohen & Levinthal, 1990; R. Thorpe, et al., 2005; Zahra & George, 2002) is undisputed; although some debate remains concerning the capabilities involved in interpreting and embedding externally acquired knowledge., There is no doubt concerning adoption of innovations (Damanpour & Gopalakrishnan, 2001; 2006, 2009; Dewar & Dutton, 1986; G. W. Downs & Mohr, 1979) as being another extremely important aspect attributed to helping a business build its innovative capabilities; which is also an important factor associated with a business's learning capabilities. Further, a majority of respondents from the primary data sample indicated that having good staff with good customer service skills, centred on such personal attributes as affable personalities and excellent people skills, were extremely important to the success of their business, and more important than having a formal higher education, discussed next.

One of the interesting findings is the importance business operators placed on having good staff, and how staff played an integral role in building innovative capabilities. For example, Siguaw et al (2006) assert that employees are vital for developing an

innovative culture by a business working ‘to select, train and reward employees that value learning, are orientated toward innovation’ (p. 565). Further, an article about improving productivity rates, based on research conducted by Christine Boedker from the Australian School of Business, found ‘people skills are in fact the hard core of high performance’ (as cited in Fox & Hooper, 2012, p. 26) that help a business extend its innovative capabilities. Thus, such people skills are of high importance for staff who deal directly with customers; however, these innate personal attributes are not intrinsically associated with, or implicitly acquired, through higher education. In summary, all the particular aspects associated with each activity listed in the propositional inventory has conceptual potential of helping a business pursue and build on innovative capabilities; however, each proposition requires further research to ascertain its empirical validity.

Q3: How can these enablers be interlinked to form a conceptual model and innovation planning framework?

Answer: The answer to this question remains incomplete because it effectively contains two parts. The first part is the innovation enablers that drive innovation activities identified by strong measures of association can be incorporated into an innovation planning framework; and these enablers are congruent with those identified as important to innovation outcomes in the extant research literature. The enablers were incorporated into a planning framework using the critical path method applied during the development of a project network plan; with the final output being a small business innovation planning framework. However, the second part of the answer can only be fully validated through further research; for example, by applying the planning framework within small business environments to ascertain its efficacy levels for managing the overall innovation process. It is presumed that, hypothetically, the planning framework exhibits strong potential for assisting small business operators more effectively manage the innovation process if the framework is applied systematically.

Therefore, the planning framework was constructed on the basis that adoption of something new will add or create value for the business. A significant majority of the sample respondents were keen adopters of new products/processes (74 per cent) and new ideas/knowledge (83 per cent) into their businesses. For example, the average

adoption rate for new products/processes was approximately seven weeks; whereas, the average adoption rate for new ideas/knowledge was approximately five weeks. Supportive of the adoption rate timeframes, 62 per cent of respondents indicated they regularly scanned external environments for new ideas, products or services during the previous 12 months. The short length of these adoption rate timeframes holds significant implications for identifying the innovativeness of a business, a factor E. Rogers (2003) asserted as significant in the categorisation of innovative businesses.

Furthermore, E. Rogers (2003) posits the: 'Rate of adoption is a relative speed with which an innovation is adopted by members of the social system. It is generally measured as the number of individuals who would adopt a new idea in a specified period, such as a year' (p. 221). The majority of respondents in the primary data sample qualified their adoption rate answers by saying it depended on the perceived benefits brought into the business by the actual product, process, idea or new knowledge being adopted. Their answers were consistent with E. Rogers' findings on the five variable types determining the rate of adoption of innovations, which concerns the relative benefits to the business of what is being adopted. Known as the Type I variable, and listed under the heading of 'Perceived Attributes of Innovation', these beneficial attributes include: 'relative advantage, compatibility, complexity, trialability and observability' (p. 222).

In summary, by using E. Rogers' adopter categorisation as the benchmark, the innovation planning framework holds substantive potential to help businesses build on their innovative capabilities. It was developed on the basis that by regularly engaging in the activities listed in the propositional inventory, and the conceptual innovation model, it will steer a business towards engaging in higher levels of innovation. As a consequence, engaging in the iterative processes involved in the innovation planning framework should ultimately enable a business to continuously build, and improve, on their innovative capacity and capabilities.

6.4 SUMMARY OF THE OVERALL FINDINGS

This section presents a tabulated summary of the overall findings of this thesis. The first section contains validation from the extant literature for application of the research design and methodological approach applied to explore small business innovation. The second section of the table presents the substantive knowledge contributions made in

the context of the major themes listed in the propositional inventory. These themes specifically address the knowledge gaps identified from the reviewed research literature. It is important to note the literature support in the Research Approach section of the table comes from the wider small business research literature; whereas, the literature support listed in the Findings section are based specifically on papers from the SLR process.

Table 6.1 **A summary of research approaches and major findings**

RESEARCH APPROACH	*SUPPORT LEVEL*	*SUPPORT LITERATURE*
Systematic literature review	**To a moderate extent** – with increasing frequency (evolving focus particularly within management and business research)	(Bartels & Reinders, 2011); (Becheikh, et al., 2006); (L. Pittaway, et al., 2004); (R. Thorpe, et al., 2006); (Tranfield, et al., 2003)
Multi-method research design	**To a high extent** (supported by its own journal)	(Bryman, 2006); (Creswell & Shope, 2006); (Cooksey, 2007); (R. B. Johnson, Onwuegbuzie, & Turner, 2007); (Kaplan, 1998); (Kasanen, et al., 1993); (McMurray, et al., 2004); (Rinne & Fairweather, 2012)
Pragmatic pluralism and Innovative constructivism	**To some small extent**	(Morgan, 2007); (Watson, 1997)
FINDINGS	***SLR SUPPORT LEVELS***	***SUPPORT LITERATURE***
Early adoption rate timeframes of new products and processes and/or ideas and knowledge	**To some extent** (17.8 per cent of the SLR articles had this aspect as one of their major theme topics)	(Archer, Wang, & Kang, 2008); (Bhaskaran, 2004); (Caniels & Romijn, 2005); (Chen & McQueen, 2008); (Dewald & Bowen, 2009); (C. Gray, 2006)
Personal and/or business characteristics including highly developed people skills, ability to identify and optimise new opportunities, and a willingness to introduce new products or processes	**To a very high extent** (37 per cent focused on personal and/or business characteristics, 25.3 per cent on similar entrepreneurial characteristics)	(Golodner, 2001); (Kropp & Zolin, 2005); (Sylvie Laforet & Tann, 2006); (Y. Li, Zhao, Tan, & Liu, 2008); (Mankelow, 2008); (McElwee & Atherton, 2005); (Olson, 1987); (Pretorius, Millard, & Kruger, 2006); (Rae, 2004); (Riemenschneider & McKinney, 2001); (Roper, 1998);
Propensity towards strategic development and marketing orientation	**To a moderate extent** (31.5 per cent focused on strategic and/or marketing orientation)	(BarNir, Gallaugher, & Auger, 2003); (Berry, 1996); (Delmar & Wiklund, 2008); (Keskin, 2006); (Lindman, Scozzi, & Otero-Neira, 2008); (Martin & Matlay, 2003);
Development of a conceptual model for small business innovation and, in turn, an innovation planning framework	**To a moderate extent** (28.8 per cent focused on models, theory or framework examination or development)	(Beijerse, 2000); (Burger-Helmchen, 2009); (Dutta & Evrard, 1999); (Hyland & Beckett, 2005); (Rodney McAdam, et al., 2000); (Scozzi, et al., 2005)
Identifying the importance of customer service via ongoing improvements in service delivery, to achieve sustainable competitive advantage	**To a moderate extent** (30.8 per cent focused on improvements in customer service to maintain competitive advantage)	(Baard & Watts, 2007); (Corman, Perles, & Yancini, 1988); (Courseault Trumbach, et al., 2006); (Georgellis, et al., 2000); (Namiki, 1988); (Otero-Neira, et al., 2009)
Importance of continual learning through ongoing training and education	**To a small extent** (8.2 per cent focused on the importance of ongoing training, professional development and education	(Butler, Reed, & Grice, 2007); (Ehrich & Billett, 2004); (Johnston, et al., 2008); (Macpherson, et al., 2003); (Thomson & Gray, 1999)

Useful support and practical tools There are good levels of support from the extant research literature which substantiate the methods and findings of this thesis. Further, one substantive knowledge contribution made by this thesis was addressing the paucity of empirical research undertaken in the context of Australian regional small business innovation (Bhaskaran, 2006; Bhattacharya & Bloch, 2004). There is the significant

importance associated with the two main outputs – the conceptual innovation model and innovation planning framework – which are timely practical tools aimed to assist small business operators. This is highlighted by Dun and Bradsheet (2011) in a quarterly report that indicates Australian business failures increased nearly 25 per cent in 2010; whereby, the majority of these failures were small businesses. In summary, the development of these small business tools is designed to assist operators build on their levels of innovative capabilities; this could mean the difference between long-term success and failure for many operators. By making a substantive contribution to the empirical research on Australian small business, these findings could have implications for small business policy development, including how future small business research is conducted, discussed next.

6.5 POLICY IMPLICATIONS AND FUTURE RESEARCH

This section discusses the potential policy implications emanating from the thesis findings, and finishes by proposing directions for future small business research. Furthermore, in addition to the potential policy implications, there may be implications for the way in which future small business management courses are structured and taught. Firstly, an important theme to emerge from the primary data interviews was the small business operators' perceptions about innovation generally, discussed next.

An emergent theme concerning small business operators' perceptions about innovation is primarily anecdotal because general conversation was not recorded during the interview. However, even though a majority of small business operators understood the importance of innovation in driving the success of their business, a significant percentage of respondents suggested innovation was not a 'silver bullet' to guarantee the business's longevity. This perspective is supported by Lin and Chen (2007), for example, whose research into SMEs' sales performance concludes 'innovation is not a panacea' (p. 125). A commonly expressed belief by one respondent was that: 'All the bells and whistles of innovation would not help the business succeed if they did not provide adequate levels of customer service'. The majority of respondents believed that making sure the needs of their customers were satisfied was just as important, if not more important, than trying to constantly innovate. Indeed, it is this simple, yet fundamentally important and extremely insightful perception that has the potential to shape future small business policy development. This widely held perception of

customer focus from small business operators needs to be taken into account when determining future small business innovation research. In summary, anecdotal evidence confirms small business operators understand the importance of innovation for business success, yet they do not rank it as more important than providing good customer service. Such a perception has important implications for future small business policy, discussed next.

Identifying innovative small businesses One important policy development question is: how do innovation funding bodies identify and assess innovative small businesses? This question is important because highly innovative small businesses may be overlooked by funding bodies because they do not 'appear' innovative using current measures. For example, this thesis has established that the current proxy measures of innovation, R&D innovation related expenditure and patents counts, are inappropriate when applied to the majority of small businesses. Therefore, it is apparent that development of future innovation policy needs to incorporate new innovation measures appropriate for the small business sector. The findings from this thesis potentially contribute to future policy development for the small business sector, particularly in the area of identifying businesses with high levels of innovative capabilities who apply for innovation development and support grants. Indeed, an insider's view of the vagaries and assessment hurdles associated with applying for government funding for innovation development is discussed next.

As a case in point, the following excerpt provides an insightful perspective on how a government bureaucrat views the assessment process applied to innovation grant funding. The comment comes from a friend who was a Principal Project Officer employed with the Queensland Government's Department of Education, Employment, Development and Industry (DEEDI). In response to a question about sourcing funding for a local business to commercialise their innovation, he replied:

> State government grants are a pain in the proverbial to obtain and I would counsel everyone to avoid them as the money is simply not worth the aggravation. Essentially, the risk profile of the companies receiving funding, and the incremental nature of the projects funded, makes me wonder why the government bothers at all. Commonwealth grants have been a source for innovation for years in one form or another. However, they seem to go through

> several iterations reflecting the most recent policy imperative facing the government. At this time it is manufacturing, carbon tax and clean tech[nology].
>
> Excerpt from personal email dated 6 February 2012

This excerpt is demonstrative of the problems faced by small businesses seeking government funding for commercialising their innovative outputs. Importantly, various government departments offer to provide financial assistance for small businesses to support R&D activities towards commercialising their innovations: but is the effort involved 'worth the aggravation'. This excerpt clearly demonstrates many perceptual and administrative hurdles still need to be overcome before real funding assistance is readily accessible to small businesses wanting to commercialise their innovations. Nonetheless, one specific way of changing this situation, for example, is to redevelop the funding assessment criteria applied to small business innovation grants. This would require the development of new innovation metrics to accurately reflect a small business's true level of innovation capability: a situation this thesis has made a substantive contribution towards. Governments claim to support small businesses seeking innovation development and commercialisation funding; however, the assessment criteria process applied is viewed as extremely arduous and time consuming. Hence, the findings of this thesis have potential application towards the re-evaluation of more appropriate assessment criteria used to assess small business innovation funding submissions and grant applications, discussed next.

Re-evaluating the innovation funding assessment criteria The current assessment criteria used by government departments to evaluate small business innovation development funding are complex. For example, the Commercialisation Australia (CA) *Customer Information Guide* for commercialisation grants states: 'The program is not designed to assist with the development of new internal processes to enhance overall productivity, or minor incremental improvements or derivatives of established products, processes or services in the marketplace' (Commercialisation Australia, 2013, p. 3). Moreover, CA 'does not fund R&D projects' (p. 9); a point which seems rather incongruous as R&D is a key component of many innovation projects. However, they will support projects when 'a company is able to demonstrate, consistent with its value proposition, market acceptance of its new product, process or service in its key target market(s)' (p. 9). An application submitted to CA for commercialisation funding is

based on merit criteria such as: need for funding; market opportunity; execution plan; management capability; and national benefits. Such information is vital for assessing a funding application; albeit, there is widespread acknowledgement within the small business research literature of the resource constraints small businesses face (Edelman, et al., 2002; Hadjimanolis, 2000; Julien, StPierre, & Beaudoin, 1996). Therefore, the requirement by CA for an applicant to prove market acceptance of an innovation before funding it seems contrary to the commercialisation process. This is not the only problem, as government funding bodies still have no accurate measures of small business innovation, discussed next.

Patent counts and R&D innovation expenditure are still currently used by government departments as proxy measures for measuring the innovativeness of small businesses (Anon, 2012). This thesis, supported by its findings and other Australian research focused on the development of innovation metrics (Arundel & O'Brien, 2009), argues these proxy measures of innovation require substantial reassessment when applied to the small business sector. For example, only one of the 100 businesses interviewed for this sample had registered a patent in the previous 12 months. If using the current government proxy measures, does this mean the other 99 businesses are non-innovators? Additionally, there are serious questions about the benefits of patent protection on innovations (Greenhalgh, Pitkethly, & Rogers, 2010; Michael & Pearce, 2009), and whether patents are actually representative of true innovation levels of a business, as discussed in chapter 2. By using a five-point Likert scale, where 1 represented ‘Not at all’ and 5 represented ‘All the time’, to ascertain how frequently businesses spend on R&D innovation activities, the mean response was only 2.05. Consequently, this figure represented an average response of ‘A little bit of the time’ relative to R&D innovation expenditure frequency levels. In summary, the findings of this thesis support the proposition that the two innovation proxy measures currently used by government funding bodies and statistical agencies are not relevant in the small business setting. Thus, more appropriate innovation measures need to be developed for government funding assessment criteria, which could include adoption rate timeframes, discussed next.

A time for measuring innovation This thesis found a majority of small businesses have relatively short adoption rate timeframes of innovation. As stated previously, the

term innovation refers to the adoption of, or capabilities to significantly improve, new products, processes, ideas or knowledge, collectively described by Dodgson (2000) as technology. The findings of this thesis indicated 48 per cent of respondents interviewed adopted new products or processes within a one month timeframe, with 74 per cent adopting within a two month timeframe. Further, new ideas or knowledge is adopted by 61 per cent of respondents within one month, while 83 per cent adopt within a two month timeframe. Thus, short adoption rate timeframes present a useful potential metric for inclusion in the assessment criteria frameworks used by government funding bodies and statistical agencies to evaluate innovation levels in small businesses. This assertion is supported by comments in the Australian Innovation Systems Report 2012 (Anon, 2012), for example, which posits: 'Australia still tends to invest considerably more in adopting and modifying innovations of others rather than investing in more novel forms of innovation' (p. 4). The short adoption rate timeframes indicate a majority of the thesis sample fall into what E. Rogers categorised as Innovators and Early Adopters, given an adoption rate period of 12 months is used as the benchmark. Indeed, E. Rogers asserts: 'The criterion for adopter categorisation is *innovativeness*, the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of the social system' (2003, p. 280). In summary, the development of an innovation adoption rate timeframe exhibits substantive potential as an innovation indicator for small businesses, showing significant benefits over the current innovation proxy measures of patent counts and R&D expenditure. Next, the potential for combining an adoption rate timeframe with other indicators is discussed.

Combining enablers to form indicators Innovation's complexity necessitates a range of measures and indicators required for assessing a small business's level of innovative capability. The development of such measures and combined predictive indicators, by combining various innovation enablers, is discussed previously in the answer to research question 4. However, integrating a wider range of these innovation enablers into a matrix, to form a predictive indicator framework, could provide a more robust assessment tool of a business's attributes and abilities necessary for building innovative capabilities. For example, a business exhibiting high levels of several key attributes, but only moderate levels of several less important attributes, would still obtain an aggregated score predictive of their potential capacity to successfully innovate. It should be noted that work similar to this has already been undertaken with the development of

a framework for indicators used to assess levels of innovation knowledge flows in a report produced by the Australian Innovation Research Centre (Arundel & O'Brien, 2009).

Nonetheless, such a predictive indicator framework alone would not be an appropriate assessment criterion of innovative capabilities. To clearly identify small businesses with high levels of innovativeness other factors including historical data and management abilities need to taken into account; albeit, it would certainly be a step in the right direction. Innovation development funding assistance is urgently required throughout this economically important sector, where overall resources are known to be constrained; therefore, more contextually specific assessment tools and processes are needed. Indeed, development of future small business policies needs to stimulate and facilitate; rather than mitigate and aggravate the small business sectors' ability to develop increased innovative capacity and capabilities. In summary, the findings indicate a range of innovation drivers could be integrated to form a predictive indicator framework capable of identifying a small business's potential ability to innovate. Helping small businesses increase their innovation knowledge and capabilities can also come through refocusing future small business research, discussed next.

The importance of a small business focus A significant contribution made by this thesis is its actual focus on small business innovation processes as opposed to SMEs. Indeed, in 1981 Welsh and White declared that 'a small business is not a little big business' (as cited in Tan, et al., 2009, p. 233); whereas, much of the identified innovation research is skewed towards the SME sector. The reason a small business focus is important, for example, is that a sole operator business, or a micro-business with four employees, will obviously operate and innovate quite differently to a business with 50 plus employees. Much of the extant research literature, various government agency publications, and a majority of the wider grey literature including business textbooks, extol the virtues associated with possessing innovation capabilities to the success of businesses generally. Nevertheless, despite all the attention innovation attracts research-wise, and the important economic and labour-force contribution small businesses make to national economies, a relative paucity of empirical small business innovation research exists in Australia (Bhattacharya & Bloch, 2004; Hausman, 2005).

However, even though this may be the case with Australian small business research, it is certainly not the case internationally, discussed next.

The SLR process undertaken for this thesis proved there are substantial volumes of research focused on the subject of small business innovation. For example, the number of hits returned using the initial search string, *small business AND innov**, to search electronic databases exceeded 80,000 papers. Admittedly, such a search string casts a very wide net, capturing studies which simply may make reference to these two terms. Nonetheless, much of the research focused on exploring the more traditional determinants of innovation such as business size, market structures and SMEs (Zoltan J. Acs & Audretsch, 1988; Bhattacharya & Bloch, 2004; Covin & Prescott, 1990). In contrast, only low numbers of empirical research papers focused on the actual processes small businesses undertake specifically in pursuit of innovation; nor was much research available that focused on the specific nature of these innovation processes (Hoffman, et al., 1998). The result of the SLR process refutes the suggestion a paucity of small business innovation research exists – it depends on definitional context. There are numerous contextual differences used to define small businesses world-wide; whereby, a considerable percentage of research is focused on SMEs. In summary, this thesis makes a valuable knowledge contribution by focusing specifically on Australian regional small businesses with less than 20 employees. In terms of future research activity, more knowledge is required on the explicit nature of what range of activities constitutes an innovation process, discussed next.

New research approaches required As several knowledge gaps still exist pertaining to small business innovation processes, future research must take a more focused approach. For example, Tan et al. (2009) assert the application of new research methods needs to be embraced. The authors argue, in part, that traditional business research methods have failed to adequately address various knowledge gaps pertaining to small business innovation processes generally. Furthermore, Hausman (2005) contends ‘quantitative research is often less valuable than qualitative research mainly because there is little guidance regarding what factors to measure’ (p. 774). The author further asserts the use of in-depth interviews, combined with qualitative analysis, facilitates the opportunity for theory development from the research observations made; as opposed to shoehorning a previously constructed model to fit the collected data. The theory

building research approach employed by this thesis has accommodated this view; whereby, multi-method research techniques were applied using semi-structured, in-depth interviews. Similar to observations by Tan et al. (2009), this thesis questioned the transferability of large organisation management principles into the small business setting, and attributed this to the 'wide variations in the quality of research execution' (p. 234). In summary, by applying a multi-method research approach, and focusing solely on exploring what drives innovation processes in small business environments, this thesis makes a substantive contribution towards addressing the deficiencies being identified within traditional research approaches. Nevertheless, the thesis findings only form basic foundations of new knowledge; hence, further research is needed to build on these foundations, discussed next.

Building on the foundations This thesis is essentially exploratory research; thus, further research is required to build a complete picture of small business innovation. Even though three foundational outputs are produced – a propositional inventory, a conceptual small business innovation model and an innovation planning framework – more research is still required. For example, these outputs require further research and testing within small business environments, preferably through longitudinal studies, to fully ascertain their applicability, veracity, efficacy levels and generalisability. In addition, four potential small business innovation measures – one measure and three predictive indicators – are proposed; albeit, these also require further testing via a longitudinal study. Thus, future research must establish empirical rigour and validity of the three outputs, and potential innovation measures, before they can be routinely applied in small business environments, discussed next.

The testing of any new measure could only truly be verified over an extended operating period, requiring a minimum observation period of three years. A three-year test period would conform to the Oslo Manual guidelines recommended for assessing business innovation levels. For example, an adoption rate timeframe applied to measure the introduction of new products/processes and ideas/knowledge has potential for measuring innovation levels of small businesses. To obtain a measure of innovation, the adoption rates of a business are measured against a range of factors correlated to high levels of known innovation capability such as increased market share, improved profitability and cost efficiency or productivity gains (Anon, 2012). Moreover, another

justification for undertaking a longitudinal study, according to Tan et al. (2009), is because new methods and approaches are required to establish a '"live-with-meaning" best-practices database' for the small business sector (p. 249). In summary, the multiple outputs from this thesis provide strong foundations for future research to establish a database of best practices using suitable innovation measures; in turn, this database becomes a tool kit for small businesses to further build on their innovation capabilities. Next, a final overall conclusion about the thesis findings is discussed.

6.6 THE OVERALL CONCLUSION

The substantive knowledge contribution made by thesis provides usable research outputs for the Australian regional small business sector. In addition to the innovation planning framework, aimed at initiating and facilitating innovation processes, the findings also contribute to broadening the knowledge base of the small business sector with sound empirical credibility. The three outputs from this thesis are:

1. a propositional inventory of small business innovation activities;
2. a conceptual small business innovation model; and,
3. a small business innovation planning framework.

Further, the application of mixed methods research applied to the research is in itself an attempt to embrace an innovative spirit by adopting 'novel' approaches to small business innovation research. The inherent complexity involved in researching innovation suggested throughout the extant research literature fostered an innovative, somewhat entrepreneurial, approach to the research design. Innovation is closely associated with entrepreneurship; hence, I adopted a construct from Niccolo Machiavelli's *The Prince* that suggests entrepreneurs understand there is little difference between an obstacle and an opportunity, and therefore are able to take advantage of both. This thesis sought to simplify the complexities of innovation research by adopting a relatively novel, yet systematic, approach to the research topic. The thesis findings provide an insightful view of the innovation activities that lead to enhanced innovative capabilities which are contextually specific to regional small business environments; thereby, presenting an opportunity for specialisation within a niche market. Additionally, the three outputs are easily interpreted by small business practitioners; presenting a further opportunity for tapping into a niche market, discussed next.

User-friendly outputs According to Tan et al. (2009), the extant research literature presents a 'relatively narrow sliver' (p. 249) of what is involved in sustaining a successful small business. To achieve the second overarching objective, this thesis took a practitioner-based perspective to the research that produced outputs that are usable by the key beneficiary of the research: small business operators. Therefore, a substantive contribution is made to the current knowledge base on small business innovation by providing three useful tools as outputs; in addition to yielding contextually specific knowledge about small business practices which are practitioner friendly, and with strong levels of generalisability. Obviously, additional research and testing of the outputs and measures is required, preferably using longitudinal studies, to provide further substantiated validity of the outputs in the context of small business environments. The findings may also assist with, or at least facilitate a rethink of, the ways small business policy development and innovation funding assessment criteria are undertaken in the future. However, one final question about the overall importance of innovation to small business success needs to be addressed, discussed next.

The final question to answer on innovation is: how important is it to Autralian regional small business success? Innovation is espoused as extremely important to the success of businesses generally, particularly in business grey business literature, government publications and text books. For example, one headline announced: 'Innovate or perish' (Ruthven, 2005), suggesting that innovation is a vital component for success; albeit, the anecdotal evidence from the primary data sample was only partly supportive of this notion. Indeed, sixteen years personal experience as a field researcher with Roy Morgan Research provided substantial anecdotal evidence indicating innovation is certainly an important contributor to business success; however, it is not the main factor. Synthesis of all the combined empirical and anecdotal evidence brings business success down to one critical factor: looking after the customer. Indeed, if one looks at this logically, the point is plainly obvious that without customers, a business will not survive. To explain this point further the natural selection model (Aldrich & Pfeffer, 1976) is used as an innovation metaphor, discussed next.

Innovation as an evolutionary process To demonstrate the thesis findings, the natural selection model is applied to the evolution process of small business innovation. A conceptual model first given prominence by Campbel (1969 as cited by Aldrich &

Pfeffer, 1976) over four decades ago, the natural selection model reflects the changes a business goes through in adopting and adapting to changes in its environment to give it a competitive advantage. Thus, in evolutionary terms innovation is the metaphorical equivalent to a mutant gene that causes some form of variation, allowing small businesses to adapt to changing business environments through specialisation; and in turn, creating a competitive advantage. Investigating the ways businesses evolve and change over time, Aldrich and Pfeffer (1976) compare the different dimensions between the natural selection and the resource dependence models. The first of these models was deemed to be most likely to help explain the role innovation plays in the evolutionary theory underpinning how a business adapts to changing operating environments.

Of the 100 small businesses interviewed for the sample, many demonstrated how they have adopted new innovations, allowing them to adapt to changing business environments. According to Aldrich and Pfeffer (1976), the natural selection process occurs in three stages: learning attributed variation; consistent selection criteria; and, a positive retention mechanism. The application of each stage facilitates the evolution of a business towards achieving better fit within its operating environment. To demonstrate such an occurrence in the internet enabler information age for example, an electronics business in Charters Towers (North-west Queensland), after setting up a website, now sells communication radios to the Antarctic Exploration Division, purely because the business provides excellent after-sales service in a specialised field. When the owner was asked if he considered himself innovative, he replied: 'No, it's not about innovation, it's simply about providing excellent customer service'. Furthermore, stages 2 & 3 dictate that when one innovation does not work the business then adopts another innovation, forming a continuous evolution process of adoption and adaptation to achieve, and maintain, a competitive advantage. Consequently, small business innovation is the equivalent of the natural selection process that allows businesses to evolve; however, the core DNA of business survival and success involves delivering excellent customer service. The concept of innovation as a natural selection evolution process is detailed in Figure 6.2: a model depicting the small business natural selection evolution process.

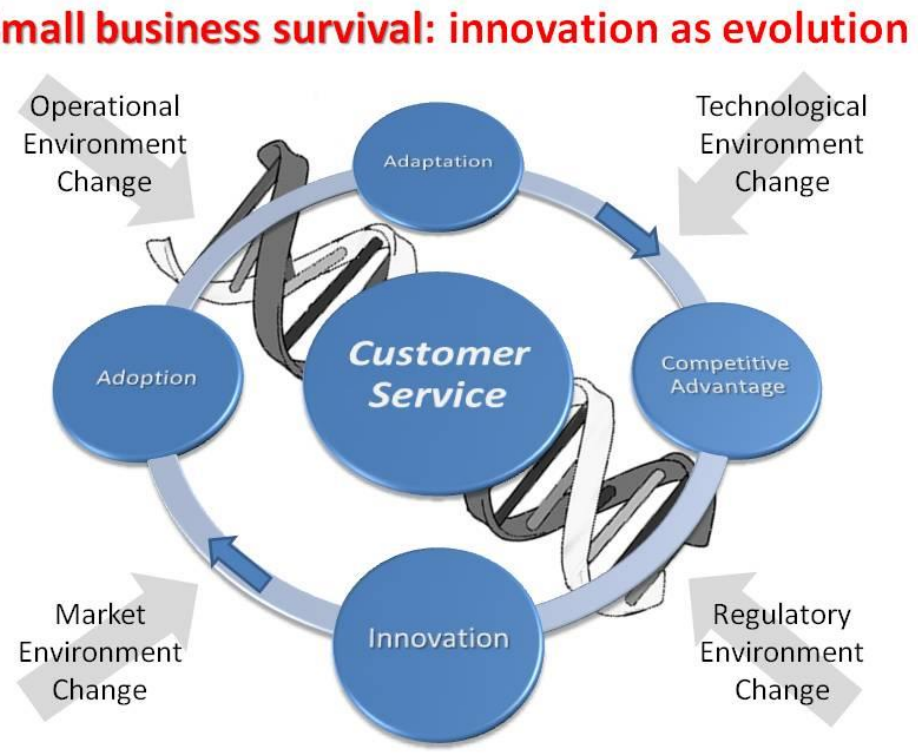


Figure 6.2 A model depicting the small business evolution process

In summary, this thesis has directly contributed to the current knowledge on small business innovation. Firstly, it has achieved the primary objective encapsulated by the three primary aims which are:

1. **To identify the enablers that drive innovation activities and processes in Australian regional small business environments.**

2. **To examine how these enablers can be interlinked to form a conceptual model and innovation planning framework contextually specific for regional small businesses.**

3. **To explore the development of metrics and/or composite indicators with the potential for measuring and/or predicting innovative capabilities within regional small business environments.**

Secondly, the thesis has achieved its secondary objective by producing practitioner-friendly tools for application by small business operators. Further, it has comprehensively answered three of the four research questions posed; whereby, more research is required to answer the fourth question about the relationship between education levels and business innovation capabilities. The overall findings present a far

clearer picture of what factors constitute innovation processes in an Australian regional small business. The thesis outputs should provide valuable assistance to the regional small business sector generally; whereas, the proposed measures provide a solid foundation for future research into small business innovation. Indeed, the concept of innovation as a natural selection evolutionary process certainly demonstrates innovation is an important factor for helping small businesses adapt to changing business environments, allowing them to evolve through specialisation to gain a competitive advantage. Nonetheless, innovation needs to be effectively managed in concert with providing excellent customer service if a business wants to achieve, and maintain, a sustainable competitive advantage. Indeed, innovation is crucial as it allows a business to adopt and adapt to changing business environments and emerging consumer trends; but tending to the needs of customers is paramount as without customers, you have no business.

REFERENCES

ABS (2003). *Innovation in Australia Business Survey 2003*. from www.abs.gov.au.

Acs, Z. J. (1988). Innovation and technical change in the U.S. steel industry. *Technovation, 7*(3), 181-195.

Acs, Z. J., & Audretsch, D. B. (1988). Innovation and firm size in manufacturing. *Technovation, 7*(3), 197-210.

Acs, Z. J., & Audretsch, D. B. (1990). *Innovation and Small Firms*. Cambridge, Mass: The MIT Press.

Acs, Z. J., & Audretsch, D. B. (2003). Introduction to the Handbook of Entrepreneurship Research *Handbook of entrepreneurial research: An interdisciplinary survey and introduction* (Vol. 1, pp. 3-20). Boston; Dordrecht and London: Kluwer Academic.

Aguirre, B. (1976). *Problems of method in the development of propositional inventories in the field of disaster research*: The Ohio State University.

Aldrich, H. E., & Pfeffer, J. (1976). Environments of Organizations. *Annual Review of Sociology, 2*(1), 79-105.

Ambert, A. M. (1994). A qualitative study of peer abuse and its effects: theoretical and empirical implications. *Journal of Marriage and Family, 56*(16), 130-136.

Ambert, A. M., Adler, P. A., Adler, P., & Detzner, D. F. (1995). Understanding and evaluating qualitative research. *Journal of Marriage and Family, 57*(4), 879-894.

Anon (Ed.) (1987) The Australian Concise Oxford Dictionary (1st ed.). Melbourne, Vic: Oxford University Press.

Anon (2006). *Backing Australia's Ability: What is Innovation?* from www.innovation.gov.au.

Anon (2011). *Business failures on the rise*: Dun & Bradsheet.

Anon (2012). *Australian Innovation System Report*. from www.innovation.gov.au/AISreport.

Anon (2013). *Regulator Engagement with Small Business*. Canberra: Australian Commonwealth Government.

Archer, N., Wang, S., & Kang, C. (2008). Barriers to the adoption of online supply chain solutions in small and medium enterprises. *Supply Chain Management: An International Journal, 13*(1), 73 - 82.

Argyrous, G. (2005). *Statistics for Research: with a guide to SPSS* (2nd ed.). London, UK: Sage Publications Ltd.

Arundel, A., & O'Brien, K. (2009). *Innovation metrics for Australia*: Australian Innovation Research Center.

Atherton, A., & Hannon, P. D. (2000). Innovation processes and the small business: a conceptual analysis. *International Journal of Business Performance Management, 2*(4), 276-292.

Baard, V., & Watts, T. (2007). Breaking the Paradox of Innovation in Small Businesses through Sustaining and Disruptive Reinvention. *Australasian Accounting Business & Finance Journal, 1*(2), 25.

Babbie, E. (2002). *The Basics of Social Research* (2nd ed.). Belmont, CA: Wadsworth, Thomson Learning.

BarNir, A., Gallaugher, J. M., & Auger, P. (2003). Business process digitization, strategy, and the impact of firm age and size: the case of the magazine publishing industry. *Journal of Business Venturing, 18*(6), 789-814.

Bartels, J., & Reinders, M. J. (2011). Consumer innovativeness and its correlates: a propositional inventory for future research. *Journal of Business Research, 64*, 601-609.

Bartol, K., Martin, D., Tein, M., & Matthews, G. (2001). *Management: a Pacific Rim focus* (3rd ed.). Roseville, NSW: McGraw-Hill Book Company Australia Pty Limited.

Batterham, A. M. (2002). Comment of "Dimensions of Research'. *Sportscience, 6*.

Beaver, G. (2002). *Small Business, Entrenpreneurship and Enterprise Development*. Essex: Person Education Limited.

Becheikh, N., Landry, R., & Amara, N. (2006). Lessons for innovation empirical studies in the manufacturing sector: A systematic review of the literature from 1993-2003. *Technovation, 26*, 644-664.

Behrens, N. (2009, August-September). Breaking the Shackles. *Leading Business*.

Beijerse, R. P. (2000). Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs. *Journal of Knowledge Management, 4*(2), 162 - 179.

Bennett, R., Bove, L., Dann, S., Drennan, J., Frazer, L., Gabbott, M., et al. (2002). *Services Marketing: a managerial approach*. Milton, Qld: John Wiley and Sons Australia, Ltd.

Berenson, M. L., Levine, D. M., Krehbiel, T. C., Watson, J., Jayne, N., & Turner, L. (Eds.). (2007). *Basic Business Statistics: Concepts and Applications* (Australasian and Pacific ed.). Frenchs Forest, NSW: Pearson Education Australia.

Berry, M. M. J. (1996). Technical entrepreneurship, strategic awareness and corporate transformation in small high-tech firms. *Technovation, 16*(9), 487-522.

Bessant, J., Phelps, B., & Adams, R. (2005). *External knowledge: a review of the literature addressing the role of external knowledge and expertise at key stages of business growth and development*. London: Imperial College.

Bhandari, M., Guyatt, G. H., Montori, V., Devereaux, P. J., & Swiontkowski, M. F. (2002). User's guide to the orthopaedic literature: how to use a systematic literature review. *The Journal of Bone and Joint Surgery, 84-A*(Nine), 1672-1682.

Bhaskaran, S. (2004). Strategic experimentation and innovation in rural Australia. *British Food Journal, 106*(2), 141 - 152.

Bhaskaran, S. (2006). Incremental innovation and business performance: Small and medium-size food enterprises in a concentrated industry environment. *Journal of Small Business Management, 44*(1), 64-80.

Bhattacharya, M., & Bloch, H. (2004). Determinants of innovation. *Small Business Economics, 22*(2), 155-162.

Billett, S. (2001). Increasing small business participation in VET: a "hard ask". *Education and Training, 43*(8/9), 416-425.

Birchall, A. (2012). Imagine the possibilities. *Management Today*, 22-23.

Birkinshaw, J., Hamel, G., & Mol, M. (2005). *Management Innovation*. London, England: Advanced Institute of Management Research.

Bititci, U., Mendibil, K., Martinez, V., & Albores, P. (2005). Measuring and managing performance in extended enterprises. *International Journal of Operations & Production Management, 25*(4), 333-353.

Black, G. C. (2001). *The geography of small firm innovation.* Unpublished Dissertation, Georgia State University, Atlanta, Georgia, USA.

Blackie, T. (2006). Knowledge is power. *BRW*.

Bosworth, D., & Rogers, M. (2001). Market value, R&D and Intellectual property: An Empirical Analysis of Large Australian Firms. *The Economic Record, 77*(239), 323-337.

Brereton, P., Kitchenham, B. A., Budgen, D., Turner, M., & Khalil, M. (2007). Lessons from applying the systematic literature review process within the software engineering domain. *The Journal of Systems and Software, 80*, 571-583.

Breschi, S., & Lissoni, F. (2001). Knowledge Spillovers and Local Innovation Systems: A Critical Survey. *Ind Corp Change, 10*(4), 975-1005.

Brickau, R., Chaston, I., & Mangles, T. (1994). Factors influencing the performance of SME food processing companies within the single European market. *International Business Review, 3*(2), 165-178.

Brown, C., & Frame, P. (2007). Innovation Management: a subjective process. *International Journal of Management Concepts and Philosophy, 2*(3), 209-224.

Bruce, C. (n.d.). Supporting literature reviews: materials for supervisors to use with student. Unpublished Workshop handout. Queensland University of Technology.

Brush, C. G., & Chaganti, R. (1999). Businesses without glamour? an analysis of resources on performance by size and age in small service and retail firms. *Journal of Business Venturing, 14*(3), 233-257.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research, 6*, 97-113.

Burger-Helmchen, T. (2009). Capabilities in small high-tech firms: a case of plural-entrepreneurship. *Journal of Small Business and Enterprise Development, 16*(3), 391 - 405.

Burrell, G., & Morgan, G. (1979). Sociological paradigms and organisational analysis.

Butler, A., Reed, M., & Grice, P. L. (2007). Vocational training: trust, talk and knowledge transfer in small businesses. *Journal of Small Business and Enterprise Development, 14*(2), 280 - 293.

Cameron, C. (1998). *Innovation and growth: a survey of the empirical evidence.* Unpublished A working paper based upon Chapter 2 of his PhD thesis, Oxford University, London.

Caniels, M. C. J., & Romijn, H. A. (2005). What works, and why, in business services provision for SME: insights from evolutionary theory. *Managing Service Quality, 15*(6), 591 - 608.

Carayannis, E. G., & Provance, M. (2008). Measuring firm innovativeness: towards a composite innovation index built on firm innovative posture, propensity and performance attributes. *International Journal of Innovation and Regional Development, 1*(1), 90-107.

Chase, D. R., & Godbey, G. C. (1983). The accuracy of self reported participation rates. *Leisure Studies, 2* (2), 231-236.

Chaston, I. (1997). Small firm performance: assessing the interaction between entrepreneurial style and organizational structure. *European Journal of Marketing, 31*(11/12), 814 - 831.

Chen, J., & Chen, I. (2007). Constructing Taiwanese Small-Enterprise Innovative Capital Indices by Using Fuzzy AHP. *The Business Review, Cambridge, 8*(2), 159.

Chen, J., & McQueen, R. J. (2008). Factors affecting E-commerce stages of growth in small Chinese firms in New Zealand: An analysis of adoption motivators and inhibitors. *Journal of Global Information Management, 16*(1), 26-60.

Clark, D. N. (2008). *Innovation Management Processes in SME's: The New Zealand Experience*. Paper presented at the ANZAM Conference.

Clark, M., Eaton, M., Lind, W., Pye, E., & Bateman, L. (2011). *Key Statistics: Australian Small Business*. Canberra: Commonwealth Government.

Coakes, S. J., Steed, L., & Price, J. (2008). *SPSS: analysis without anguish: version 15.0 for Windows*. Milton. Qld: John Wiley & Sons Australia, Ltd.

Cohen, W. M., & Klepper, S. (1996). Firm size and the nature of innovation within industries: the case of process and product R&D. *Review of Economics and Statistics, 78*(2), 232-243.

Cohen, W. M., & Levinthal, D. A. (1989). Innovation and Learning:The Two Faces of R&D. *The Economic Journal, 99*(September), 569-596.

Cohen, W. M., & Levinthal, D. A. (1990). Absorpitive capacity: A new perspective on learning and innovation. *Administrative Services Quarterly,, 35*(1), 128-152.

Collis, J., & Hussey, R. (2003). *Business Research: A practical guide for undergraduate and postgraduate students* (2nd ed.). Hampshire: Palgrave McMillan.

Commercialisation Australia (2013). *Customer information guide*.

Cook, D. J., Mulrow, C. D., & Haynes, R. B. (1997). Systematic reviews: synthesis of best evidence for clinical decisions. *Annals of Internal Medicine, 126*(5), 376-380.

Cooke, P., & Wills, D. (1999). Small firms, social capital and the enhancement of business performance through innovation programmes. *Small Business Economics, 13*, 219-234.

Cooksey, R. (2007). *Combining Qualitative and Quantitative Methods*. Paper presented at the ANZAM Midyear Doctoral Workshop.

Cooper, H. (1998). *Synthesizing Research*. Thousand Oaks, CA: Sage.

Corman, J., Perles, B., & Yancini, P. (1988). Motivational Factors Influencing High-Technology Entrepreneurship. *Journal of Small Business Management, 26*(1), 36.

Courseault Trumbach, C., Payne, D., & Kongthon, A. (2006). Technology mining for small firms: Knowledge prospecting for competitive advantage. *Technological Forecasting and Social Change, 73*(8), 937-949.

Covin, J. G., & Prescott, J. E. (1990). Strategies, styles, and structures of small product innovative firms in high and low technology industries. *The Journal of High Technology Management Research, 1*(1), 39-56.

Cowan, J. (1998). *On Becoming an Innovative University Teacher: Reflection in Action*. Buckingham, UK: Open University Press.

Creswell, J. W., & Shope, R. (2006). *An introduction to mixed methods research and its design*. Paper presented at the Mixed methods research Seminar.

Cummins, D., Gilmore, A., Carson, D., & O'Donnell, A. (2000). Innovative Marketing in SMEs: A Conceptual and Descriptive Framework. *International Journal of New Product Development and Innovation Management, 2*(3), 231-248.

Cummins, D. J. (2005). The relationship of small business planning procedures: How they impact on success and performance. Unpublished Honours Thesis. James Cook University.

Damanpour, F. (1991). Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. *The Academy of Management Journal, 34*(3), 555-590.

Damanpour, F., & Gopalakrishnan, S. (2001). The Dynamics of the Adoption of Product and Process Innovations in Organizations. *Journal of Management Studies, 38*(1), 45-65.

Damanpour, F., & Schneider, M. (2006). Phases of the Adoption of Innovation in Organizations: Effects of Environment, Organization and Top Managers1. *British Journal of Management, 17*(3), 215-236.

Damanpour, F., & Schneider, M. (2009). Characteristics of Innovation and Innovation Adoption in Public Organizations: Assessing the Role of Managers. *Journal of Public Administration Research and Theory, 19*(3), 495-522.

Damanpour, F., Szabat, K. A., & Evan, W. M. (1989). THE RELATIONSHIP BETWEEN TYPES OF INNOVATION AND ORGANIZATIONAL PERFORMANCE. *Journal of Management Studies, 26*(6), 587-602.

Davidsson, P. (1991). Continued entrepreneurship: Ability, need, and opportunity as determinants of small firm growth. *Journal of Business Venturing, 6*(6), 405-429.

de Jong, J., & Vermeulen, P. (2003). Organising successful new service development: a literature review. *Management Decision, 41*(9), 844-858.

de Jong, J. P. J., & Marsili, O. (2006). The fruit flies of innovations: A taxonomy of innovative small firms. *Research Policy, 35*(2), 213-229.

de Wit, B., & Meyer, R. (2001). *Strategy: Process, Content and Context - An International Perspective*. St Paul, MN: West Publishing Company.

Dean, T. J., Brown, R. L., & Bamford, C. E. (1998). Differences in Large and Small Firm Responses to Environmental Context: Strategic Implications from a Comparative Analysis of Business Formations. *Strategic Management Journal, 19*, 709-728.

Delmar, F., & Wiklund, J. (2008). The effect of small business managers' growth motivation on firm growth: A longitudinal study. *Entrepreneurship Theory and Practice, 32*(3), 437-457.

Dent, G. (2011). Embedded with the enemy. *Business Review Weekly, Nov 10-16*, 37-37.

Dess, G. G., & Robinson, R. B. (1984). Measuring organisational performance in the absence of objective measures: the case of privately held firm and conglomerate business units. *Strategic Management Journal, 55*(10), 14-24.

Dewald, J., & Bowen, F. (2009). Storm Clouds and Silver Linings: Responding to Disruptive Innovations Through Cognitive Resilience. *Entrepreneurship Theory and Practice, 33*(1), 197-218.

Dewar, R. D., & Dutton, J. E. (1986). The Adoption of Radical and Incremental Innovations: An Empirical Analysis. *Management Science, 32*(11), 1422-1433.

Di Zhang, D., & Bruning, E. (2011). Personal characteristics and strategic orientation: entrepreneurs in Canadian manufacturing companies. *International Journal of Entrepreneurial Behaviour & Research, 17*(1), 82-103.

Dodgson, M. (2000). *The management of Technological innovation: an international and strategic approach*. New York: Oxford University Press Inc.

Dodgson, M., & Hinze, S. (2001). *Measuring innovation*. Paper presented at the Measuring and evaluating industrial R&D and innovation in the knowledge-based economy.

Downs, G. W., Jr., & Mohr, L. B. (1976). Conceptual Issues in the Study of Innovation. *Administrative Science Quarterly, 21*(4), 700-714.

Downs, G. W., & Mohr, L. B. (1979). Toward a Theory of Innovation. *Administration & Society, 10*(4), 379-408.

Drazin, R., & Schoonhoven, C. B. (1996). Community, population, and organisation effects on innovation: a multilevel perspective. *Academy of Management Journal, 39*(Five), 1065-1083.

Drucker, P. F. (1994). *Innovation and Entrepreneurship: Practice and Principles* (2 ed.). Burlington MA: Elsevier Butterworth-Heinemann.

During, W. E. (1986). Project management and management of innovation in small industrial firms. *Technovation, 4*(4), 269-278.

Dutta, S., & Evrard, P. (1999). Information technology and organisation within European small enterprises. *European Management Journal, 17*(3), 239-251.

Edelman, L. F., Brush, C. G., & Manolova, T. S. (2002). The impact of human and organizational resources on small firm strategy. *Journal of Small Business and Enterprise Development, 9*(3), 236 - 244.

Ehrich, L. C., & Billett, S. (2004). Learning new practices in small business: engagement and localised support. *Education + Training, 46*(8/9), 501 - 509.

Evans, J. R., & Lindsay, W. M. (1999). *The management and control of quality* (4th ed.). Cincinatti, Ohio: South-Western College Publishing.

Evans, N., & Sawyer, J. (2009). The Mining Boom: Challenges and Opportunities for Small Business in Regional South Australia. *Australasian Journal of Regional Studies, 15*(3), 355-372.

Eyestone, R. (1977). Confusion, diffusion and innovation. *The American Political Science Review, 17*(2), 441-447.

Feeny, S., & Rogers, M. (2001). *Innovation and Performance: Benchmarking Australian Firms*. Melbourne, Victoria: The University of Melbourne.

Ferguson, D. A. (2001). *A Conceptual Inventory of the Three Generations of Television*. Paper presented at the Management and sales division of the Broadcast Education Association. from http://fergusond.people.cofe.edu/concept3g.htm

Fink, A. (1998). *Conducting Research Literature Reviews: from a paper to the Internet.* London: Sage Publications.

Forrest, J. E. (1990). Strategic Alliances and the Small Technology-Based Firm. *Journal of Small Business Management, 28*(3), 37.

Fox, C., & Hooper, N. (2012, October, 2012). More with less. *AFR BOSS Magazine, 13*, 26-28.

Frambach, R. T., & Schillewaert, N. (2002). Organizational innovation adoption: a multi-level framework of determinants and opportunities for future research. *Journal of Business Research, 55*(2), 163-176.

Franco-Santos, M., & Bourne, M. (2005). An examination of the literature relating to issue affecting how companies manage through measures. *Production Planning and Control, 16* (2), 114-124.

Frazier, G. (1983). Interorganisational exchange behaviour in marketing channels: a broadened perspective. *Journal of Marketing Education, Fall*(47), 68-78.

Frederick, H. H., Kuratko, D. F., & Hodgetts, R. M. (2006). *Entrepreneurship; Theory, Process and Practice; Asia-Pacific edition* (1st Asia Pacific ed. Vol. 1). South Melbourne, Victoria: Thompson Nelson Australia Pty Ltd.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management, 19*(2), 110-132.

Georgellis, Y., Joyce, P., & Woods, A. (2000). Entrepreneurial action, innovation and business performance: the small independent business. *Journal of Small Business and Enterprise Development, 7*(1), 7 - 17.

Glaser, B., & Strauss, A. (1967). The Discovery of Grounded Theory.

Glenn, W., & Weerawardena, J. (1996). Strategic planning practices in small enterprises in Queensland. *Small Enterprise Research, 4*(3), 5-16.

Gnyawali, D. R., & Park, B.-J. R. (2009). Co-opetition and technological innovation in small and medium-sized enterprises: a multilevel conceptual model. *Journal of Small Business Management, 47*(3), 308-330.

Golodner, A. M. (2001). Antitrust, innovation, entrepreneurship and small business. *Small Business Economics, 16*, 31-35.

Gopalakrishnan, S., & Bierly, P. (2001). Analyzing innovation adoption using a knowledge-based approach. *Journal of Engineering and Technology Management, 18*(2), 107-130.

Gray, C. (2006). Absorptive capacity, knowledge management and innovation in entrepreneurial small firms. *International Journal of Entrepreneurial Behaviour & Research, 12*(6), 345 - 360.

Gray, C. D., & Kinnear, P. R. (2012). IBM SPSS Statistics 19 Made Simple Available from http://jcu.eblib.com.au/patron/FullRecord.aspx?p=1099431

Green, P. R. (2006). The innovative trio. *Business Review Weekly, October 5-11*, 54-56.

Greenhalgh, C., Pitkethly, R., & Rogers, M. (2010). *Intellectual property enforcement in smaller UK firms - findings from a survey in 2009-10* Paper presented at the 5th EPIP Conference.

Greenhalgh, C., & Rogers, M. (2004). *Evaluation of Innovation: The Interaction of Competition, R&D and IP*. Oxford, England: University of Oxford.

Greenhalgh, C., & Rogers, M. (2007). *The Value of Intellectual Property Rights to Firms*. Oxford, England: University of Oxford.

Griliches, Z. (1990). Patent Statistics As Economic Indicators: a Survey. *Journal of Economic Literature, 28*, 1661-1707.

Gudmundson, D., Tower, C. B., & Hartman, E. A. (2003). Innovation in small businesses: Culture and ownership structure do matter. *Journal of Developmental Entrepreneurship, 8*(1), 1-17.

Hadjimanolis, A. (2000). A resource-based view of innovatieness in small firms. *Technology Analysis & Strategic Management, 12*(2), 263.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Hannon, P. D., & Atherton, A. (1997). Small firm success and the art of orienteering: the value of plans, planning, and strategic awareness in the competitive small firm. *Journal of Small Business and Enterprise Development, 5*(2), 102-119.

Hanson, D., Dowling, P., Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2002). *Strategic Management: Competitiveness and Globalisation - Pacific Rim Edition*. Southbank, Victoria: Sotu-Western College Publishing.

Hart, C. (1998). *Doing a Literature Review: Releasing the Social Science Research Imagination*. London: Sage Publications.

Hassard, J. (1993). *Sociology and Organisation Theory*. Cambridge:: Cambridge University Press.

Hausman, A. (2005). Innovativeness among small businesses: Theory and propositions for future research. *Industrial Marketing Management, 34*(8), 773-782.

Helmers, C., & Rogers, M. (2009). *Patents, entrepreneurship and performance*. Paper presented at the Comparative Analysis of Enterprise Data 2009 Conference.

Hermans, J., & Castiaux, A. (2007). Knowledge creation through University-Industry collaborative research projects. *The Electronic Journal of Knowledge Management, 5*(1), 43-54.

Hills, G. E. (1985). Market analysis and the business plan: venture capitalists' perceptions. *Journal of Small Business Management, 23*(38), 9.

Hipp, C., & Grupp, H. (2005). Innovation in the service sector: The demand for service specific innovation measurement concepts and typologies. *Research Policy, 34*, 517-535.

Hisrich, R. D., & Peters, M. P. (2002). *Entrepreneurship* (5th ed.). New York, NY: McGraw-Hill/Irwin.

Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: a literature review. *Technovation, 18*(1), 39-55.

Hofstede, G. (1984). Cultural dimensions in management and planning. *Asia Pacific Journal of Management, 1*(2), 81-99.

Howgrave-Graham, A., & van Berkel, R. (2007). Assessment of cleaner production uptake: method development and trial with small businesses in Western Australia. *Journal of Cleaner Production, 15*(8-9), 787-797.

Hutchinson, V., & Quintas, P. (2008). Do SMEs do knowledge management? Or simply manage what they know? *International Small Business Journal, 26*(2), 131-154.

Hyland, P., & Beckett, R. (2005). Engendering an innovative culture and maintaining operational balance. *Journal of Small Business and Enterprise Development, 12*(3), 336 - 352.

Jensen, P. H., & Webster, E. (2004). *Examining biases in measures of firm innovation*. Melbourne: The University of Melbourne.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly - Qualitative Methodology, 24*(4), 602-611.

Johannesson, J.-A., Olsen, B., & Lumpkin, G. T. (2001). Innovation as newness: what is new, how new, and new to whom? *European Journal of Innovation Management, 4*(1), 20-33.

Johnson, R. A., & Wichern, D. W. (2002). *Applied multivariate statistical analysis* (5th ed.): Pearson Education International.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research, 1*(2), 112-133.

Johnston, L., Hamilton, E., & Zhang, J. (2008). Learning through Engaging with Higher Education Institutions: A Small Business Perspective. *International Small Business Journal, 26*(6), 651-660.

Jones, C. (2004). An alternative view of small firm adaptation. *Journal of Small Business and Enterprise Development, 11*(3), 362 - 370.

Jones, J. T. (2005). The determinants of training in Australian manufacturing SMEs. *Education + Training, 47*(8/9), 605 - 615.

Jones, O., & Crompton, H. (2009). Enterprise logic and small firms: a model of authentic entrepreneurial leadership. *Journal of Strategy and Management, 2*(4), 329 - 351.

Julien, P. A., StPierre, J., & Beaudoin, R. (1996). Innovation in small business, new technologies and their financing - An overview of recent research. *Canadian Journal of Administrative Sciences-Revue Canadienne Des Sciences De L Administration, 13*(4), 332-346.

Kaplan, R. S. (1998). Innovative action research: creating new management theory and practice. *Journal of Management Accounting Research, 10*, 89-118.

Kara, A., Spillan, J. E., & DeShields, O. W. (2005). The Effect of a Market Orientation on Business Performance: A Study of Small Sized Service Retailers Using MARKOR Scale. *Journal of Small Business Management, 43*(2), 105-118.

Kasanen, E., Lukka, K., & Siitonen, A. (1993). The constructive approach in management accounting research. *Journal of Management Accounting Research, 5*, 243-264.

Kerlinger, F. N. (1979). *Behavioral research: a conceptual approach* (2nd ed.). New York: Holt, Rinehart & Winston.

Keskin, H. (2006). Market orientation, learning orientation, and innovation capabilities in SMEs: An extended model. *European Journal of Innovation Management, 9*(4), 396 - 417.

Kickul, J., & Gundry, L. K. (2002). Prospecting for strategic advantage: The proactive entrepreneurial personality and small firm innovation. *Journal of Small Business Management, 40*(2), 85-97.

Kickul, J., & Gundry, L. K. (2002). Prospecting for strategic advantage: The proactive entrepreneurial personality and small firm innovation.(Statistical Data Included). *Journal of Small Business Management, 40*(2), 85(13).

Kitchenham, B. (2004). *Procedures for Performing Systematic Reviews* (Joint Technical Report No. 1353-7776).

Kitchenham, B., Brereton, P., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2009). Systematic literature reviews in software engineering - A systematic literature review. *Information and Software Technology, 51*, 7-15.

Kropp, F., & Zolin, R. (2005). Technological Entrepreneurship and Small Business Innovation Research Programs. *Academy of Marketing Science Review, 7*, 1.

Laforet, S. (2009). Effects of size, market and strategic orientation on innovation in non-high-tech manufacturing SMEs. *European Journal of Marketing, 43*(1/2), 188-212.

Laforet, S., & Tann, J. (2006). Innovative characteristics of small manufacturing firms. *Journal of Small Business and Enterprise Development, 13*(3), 363 - 380.

Lancaster, G. (1997). *The notion of corporate leanness as the basis for added benefit to customers*. Sydney, Australia: Macquarie University.

Lane, B. (2006, August 9). Over-citation puts integrity under cloud. *The Australian*.

Lee, J., & Runge, J. (2001). Adoption of information technology in small business: Testing drivers of adoption for entrepreneurs. *Journal of Computer Information Systems, 42*(1), 44-57.

Leseure, M. J. (2000). Manufacturing strategies in the hand tool industry. *International Journal of Operations and Production Management, 20*(12), 1475 - 1487.

Li, X. B., & Mitchell, R. K. (2009). The Pace and Stability of Small Enterprise Innovation in Highly Dynamic Economies: A China-Based Template. *Journal of Small Business Management, 47*(3), 370-397.

Li, Y., Zhao, Y., Tan, J., & Liu, Y. (2008). Moderating Effects of Entrepreneurial Orientation on Market Orientation-Performance Linkage: Evidence from Chinese Small Firms*. *Journal of Small Business Management, 46*(1), 113-133.

Lin, C. Y.-Y., & Chen, M. Y.-C. (2007). Does innovation lead to performance? An empirical study of SMEs in Taiwan. *Management Research News, 30*(2), 115 - 132.

Lindman, M., Scozzi, B., & Otero-Neira, C. (2008). Low-tech, small- and medium-sized enterprises and the practice of new product development: An international comparison. *European Business Review, 20*(1), 51 - 72.

Livesay, H. C., Lux, D. S., & Brown, M. A. (1996). Human factors and the innovation process. *Technovation, 16*(4), 173-186.

Lovelock, C. H., Patterson, P. G., & Walker, R. H. (2007). *Services Marketing: an Asia-Pacific and Australian perspective* (4th ed.). Frenchs Forest, NSW: Person Education Australia.

Luecke, R., & Katz, R. (2003). Managing creativity and innovation. *The Harvard business essentials*.

Lyles, M. A., Baird, I. S., Orris, J. B., & Kuratko, D. F. (1993). Formalised planning in small business: Increasing strategic choices,. *Journal of Small Business and Enterprise Development Management. , 31*(2), 38-50.

Lynskey, M. J. (2004). Determinants of innovative activity in Japanese technology-based start-up firms. *International Small Business Journal, 22*(2), 159-196.

Macpherson, A., Jones, O., Zhang, M., & Wilson, A. (2003). Re-conceptualising learning spaces: developing capabilities in a high-tech small firm. *Journal of Workplace Learning, 15*(6), 259 - 270.

Mahajan, V., & Peterson, R. A. (Eds.). (1985). *Models for innovation diffusion* (Vol. 48). Beverly Hills, California: Sage Publications Ltd.

Maine, E., Probert, D., & Ashby, M. (2005). Investing in new materials: a tool for technology managers. *Technovation, 25*(1), 15-23.

Major, E. J., & Cordey-Hayes, M. (2000). Engaging the business support network to give SMEs the benefit of foresight. *Technovation, 20*(11), 589-602.

Mankelow, G. (2008). Social responsibility paradox of small business human resource management practices. *International Journal of Human Resource Management, 19*(12), 2171-2181.

Marr, B. (2004). Measuring and benchmarking intellectual capital. *Benchmarking: An International Journal, 11*(6), 559-570.

Marr, B., & Moustaghfir, K. (2005). Defining intellectual capital: a three-dimensional approach. *Management Decision, 43*(Nine), 1114 - 1128.

Marsh, H. (2006). Conducting a research literature review. Unpublished Workshop document. James Cook University.

Martin, L. M., & Matlay, H. (2003). Innovative use of the Internet in established small firms: the impact of knowledge management and organisational learning in accessing new opportunities. *Qualitative Market Research: An International Journal, 6*(1), 18 - 26.

Massa, S., & Testa, S. (2004). Innovation or imitation? Benchmarking: a knowledge-management process to innovate services. *Benchmarking for Quality Management & Technology, 11*(6), 610-620.

Matzler, K., Bailom, F., & Mooradian, T. A. (2007). Intuitive Decision Making. *Mit Sloan Management Review, 49*(1), 13-15.

McAdam, R., Armstrong, G., & Kelly, B. (1998). Investigation of the relationship between total quality and innovation: a research study involving small organisations. *European Journal of Innovation Management, 1*(3), 139 - 147.

McAdam, R., McConvery, T., & Armstrong, G. (2004). Barriers to innovation within small firms in a peripheral location. *International Journal of Entrepreneurial Behaviour & Research, 10*(3), 206-221.

McAdam, R., Stevenson, P., & Armstrong, G. (2000). Innovative change management in SMEs: beyond continuous improvement. *Logistics Information Management, 13*(3), 138 - 149.

McElwee, G., & Atherton, A. (2005). Publication trends and patterns in entrepreneurship: The case of The International Journal of Entrepreneurship and Innovation. *Journal of Small Business and Enterprise Development, 12*(1), 92 - 103.

McGrath, R., & MacMillan, I. (2000). *The Entrepreneurial Mindset: Strategies for Continuously Creating Opportunity in an Age of Uncertainty*. Boston, MA: Harvard Business School Press.

McManus, G. (2013). Lead by example and move your training priorities with the times. *Management Today*, 51.

McMurray, A. J., Pace, R. W., & Scott, D. (2004). *Research: a commonsense approach*. Southbank, Victoria: Thomson/Social Science Press.

Menon, A., & Lukas, B. A. (2004). Antecedents and outcomes of new product development speed: A propositional inventory germane to marketing. *European Journal of Marketing, 38*(1), 209-223.

Mets, T. (2006). Creating a knowledge transfer environment: The case of Estonian biotechnology. *Management Research News, 29*(12), 754 - 768.

Michael, S. C., & Pearce, J. A. (2009). The need for innovation as a rationale for government involvement in entrepreneurship. *Entrepreneurship and Regional Development, 21*(3), 285-302.

Milbergs, E. (2004). *Measuring innovation for national prosperity - Innovation Framework Report*. Washington: National Innovative Initiative, IBM Corporation.

Milbergs, E., & Vonortas, N. S. (2005). *Innovation Metrics: Measurement to Insight*. Washington: Centre for Accelarating Innovation.

Mills, K., Bailey, M., & Douglas, J.-V. (2011, May 12-18). My Biggest Blunder. *Business Review Weekly, 33*, 20-23.

Mitev, N. N., & March, A. E. (1998). Small businesses and information technology: risk, planning and change. *Journal of Small Business and Enterprise Development, 5*(3), 228 - 245.

Moodysson, J., & Jonsson, O. (2007). Knowledge Collaboration and Proximity: The Spatial Organization of Biotech Innovation Projects. *European Urban and Regional Studies, 14*(2), 115-131.

Morgan, D. L. (2007). Paradigms Lost and Pragmatism Regained: Methodological Implications of Combining Qualitative and Quantitative Methods. *Journal of Mixed Methods Research, 1*(1), 48-76.

Morrison, A., Breen, J., & Shameem, A. (2003). Small business growth: Intention, ability, and opportunity. *Journal of Small Business Management, 41*(4), 417-425.

Mort, G. S., & Weerawardena, J. (2006). Networking capability and international entrepreneurship - How networks function in Australian born global firms. *International Marketing Review, 23*(5), 549-572.

Mosey, S. (2005). Understanding new-to-market product development in SMEs. *International Journal of Operations & Production Management, 25*(2), 114 - 130.

Mullen, M. R., Budeva, D. G., & Doney, P. M. (2009). Research Methods in the Leading Small Business-Entrepreneurship Journals: A Critical Review with Recommendations for Future Research. *Journal of small business management, 47*(3), 287-307.

Mulrow, C. D. (1994). Systematic Reviews-Rationale for Systematic Reviews. *British Medical Journal, 309*(6954), 597-599.

Namiki, N. (1988). Export Strategy for Small Business. *Journal of Small Business Management, 26*(2), 32.

Nankervis, A., Compton, R., & Baird, M. (2002). *Strategic Human Resource Management* (Fourth ed.). Southbank, Vic.: Thomson learning.

Neely, A. (2005). The evolution of performance research: Developments in the last decade and a research agenda for the next. *International Journal of Operations & Production Management, 25*(12), 1264-1277.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York; NY.: Oxford University Press Inc.

O'Dwyer, M., Gilmore, A., & Carson, D. (2009). Innovative marketing in SMEs. *European Journal of Marketing, 43*(1/2), 46 - 61.

Oakey, R. P., & Cooper, S. Y. (1991). The relationship between product technology and innovation performance in high technology small firms. *Technovation, 11*(2), 79-92.

OECD/Eurostat (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3rd ed.). Paris: OECD Publishing.

Olsen, J., Lee, B., & Hodgkinson, A. (2006). Innovation in small and medium-sized enterprises: A study of businesses in New South Wales, Australia. Unpublished Economics working paper. University of Wollongong. .

Olson, P. D. (1987). Entrepreneurship and Management. *Journal of Small Business Management, 25*(3), 7.

Ortega-Argiles, R., Vivarelli, M., & Voigt, P. (2009). R&D in SMEs: a paradox? *Small Business Economics, 33*(Three), 11.

Otero-Neira, C., Lindman, M. T., & Fernandez, M. J. (2009). Innovation and performance in SME furniture industries: An international comparative case study. *Marketing Intelligence & Planning, 27*(2), 216 - 232.

Parker, R. (2000). Small is not necessarily beautiful: An evaluation of policy support for small and medium-sized enterprises in Australia. *Australian Journal of Political Science, 35*(2), 239-253.

Pegler, A. (2008). SME's: Where do we fit? *Monash Business Review, 4*(2), 12-17.

Peltier, J. W., Schibrowsky, J. A., & Yushan, Z. (2009). Understanding the Antecedents to the Adoption of CRM Technology by Small Retailers: Entrepreneurs vs Owner-managers. *International Small Business Journal, 27*(3), 307-336.

Perry, C., & Wildman, P. (1989). Training the Unemployed for Entrepreneurship: Blending Personal and Business Development in Australia. *Journal of European Industrial Training, 13*(1), 808 -810.

Perry, S. C. (2001). The relationship between written business plans and the failure of small businesses in the US. *The Journal of Small Business Management, 39*(3), 201-208.

Pflughoeft, K. A., Ramamurthy, K., Soofi, E. S., Yasai-Ardekani, M., & Zahedi, F. M. (2003). Multiple conceptualizations of small business web use and benefit. *Decision Sciences, 34*(3), 467-512.

Pilzer, P. Z. (1991). *Unlimited Wealth: The Theory and Practice of Economic Alchemy*. New York: Random House.

Pilzer, P. Z. (2006). *The next Millionaires*. MacMahons Point, NSW: Griffin Press.

Pittaway, L., & Cope, J. (2007). Entrepreneurship Education: A Systematic Review of the Evidence. *International Small Business Journal, 25*(5), 479-510.

Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). *Networking and innovation in the UK: a systematic review of the literature*. Lancaster: Advanced Institute of Management Research.

Porter, M. E. (1990). *The Competitive Advantage of Nations*. London: Macmillan.

Prajogo, D. I. (2006). The relationship between innovation and business performance - a comparative study between manufacturing and service firms. *Knowledge and Process Management, 13*(3), 218-225.

Prajogo, D. I., McDermott, C. M., & McDermott, M. A. (2013). Innovation orientations and their effects on business performance: contrasting small- and medium-sized service firms. *R&D Management, 43*(5), 486-500.

Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega-International Journal of Management Science, 27*(4), 467-484.

Pretorius, M., Millard, S. M., & Kruger, M. E. (2006). The relationship between implementation, creativity and innovation in small business ventures. *Management Dynamics, 15*(1), 2-13.

Quaddus, M., & Hofmeyer, G. (2007). An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses. *European Journal of Information Systems, 16*(3), 202-215.

Quinn, J. (1994). Logical incrementalism. In B. De Wit & R. Meyer (Eds.), *Strategy - process, content, context: an international perspective* (pp. 51-61). St. Paul, MN: West Publishing Company.

Quinn, J. (2000). Outsourcing innovation: the new engine of growth. *Sloan Management Review, 41*(4), 13-28.

Radas, S., & Bozic, L. (2009). The antecedents of SME innovativeness in an emerging transition economy. *Technovation, 29*(6-7), 438-450.

Rae, D. (2004). Practical theories from entrepreneurs' stories: discursive approaches to entrepreneurial learning. *Journal of Small Business and Enterprise Development, 11*(2), 195 - 202.

Ramdani, B., Kawalek, P., & Lorenzo, O. (2009). Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise Information Management, 22*(1/2), 10 - 24.

Reed, M. (1985). *New Directions in Organisational Analysis*. London Tavistock.

Reith, P. (1999). *Government targets small business for job growth and job creation*.

Riemenschneider, C. K., & McKinney, V. R. (2001). Assessing belief differences in small business adopters and non-adopters of web-based e-commerce. *Journal of Computer Information Systems, 42*(2), 101-107.

Rinne, T., & Fairweather, J. (2012). A Mixed Methods Approach: Using Cultural Modeling and Consensus Analysis to Better Understand New Zealand's International Innovation Performance. *Journal of Mixed Methods Research, 6*(3), 166-183

Robertson, T. J. (1967). The process of innovation and the difussion of innovation. *Journal of Marketing, 31*(1), 14-19.

Robinson, R., & Pearce, J. (1984). Research thrusts in small firm strategic planning. *Academy of Management Review, 9*(1), 128-137.

Rogers, E. (1995). *Diffusion of Innovations* (4th ed.). New York, NY: Free Press.

Rogers, E. (2003). *Diffusion of Innovations* (5th ed.). New York, NY: Free Press.

Rogers, M. (1998). *The definition and measurement of Innovation*. Melbourne, Australia: The University of Melbourne.

Rogers, M. (1999). The performance of small and medium enterprises: an overview using the Growth and Performance Survey. The University of Melbourne.

Rogers, M. (2004). Networks, Firm Size and Innovation. *Small Business Economics, 22*(2), 141-153.

Rogers, M. (2010). The Incidence and Significance of Patenting *SABIP the Role and Rationale of IPRs*. na: na.

Rogers, M., & Helmers, C. (2009). *An Analysis of the Innovative Activity of Entrepreneurial and Young Firms in the UK*.

Romijn, H., & Albaladejo, M. (2002). Determinants of innovation capability in small electronics and software firms in southeast England. *Research Policy, 31*(7), 1053-1067.

Romijn, H., & Albu, M. (2002). Innovation, networking and proximity: Lessons from small high technology firms in the UK. *Regional Studies, 36*(1), 81-86.

Roper, S. (1998). Entrepreneurial characteristics, strategic choice and small business performance. *Small Business Economics, 11*(1), 11-24.

Rothwell, R. (1985). Venture finance, small firms and public policy in the UK. *Research Policy, 14*(5), 253-265.

Rothwell, R. (1989). Small firms, innovation and industrial change. *Small Business Economics, 1*, 51-64.

Rothwell, R. (1994). Towards the Fifth-generation Innovation Process. *International Marketing Review, 11*(1), 7 - 31.

Rothwell, R., & Zegveld, W. (1982). *Innovation and the small and medium sized firm*. London: Frances Pinter Limited.

Russell, R. D. (1989). How Organisational Culture Can Help to Institutionalise the Spirit of Innovation in Entrepreneurial Ventures. *Journal of Organizational Change Management, 2*(3), 7 - 15.

Ruthven, P. (2005, March 17-23). Innovate or Perish. *Business Review Weekly, 27*.

Sahlman, W. A. (1997). How to write a great business plan. *Harvard Business Review, 75*(4), 99-110.

Schaper, M. (2006, July 13-19). When is failure not a failure. *Business Review Weekly*, 73.

Schaper, M., & Volery, T. (2004). *Entrepreneurship and small business: a Pacific Rim perspective*. Milton, Qld: John Wiley and Sons Australia, Ltd.

Schilling, M. A. (2005). *Strategic management of terchnological innovation*. New York, NY: McGraw-Hill/Irwin.

Schultz, M., & Hatch, M. J. (1996). Living with multiple paradigms: the case of paradigm interplay in organisational culture studies. *Academy of Management Review, 21*(2), 529-557.

Schumpeter, J. A. (1934). *The Theory of Economic Development*. Cambridge, MA: Elsevier Science Publishers B.V.

Schumpeter, J. A. (1947). The creative response in Economic History. *The Journal of Economic History, 7*(2), 149-159.

Scozzi, B., Garavelli, C., & Crowston, K. (2005). Methods for modeling and supporting innovation processes in SMEs. *European Journal of Innovation Management, 8*(1), 120 - 137.

Sekaran, U. (1992). *Research Methods for Business: A Skills Building Approach* (2nd ed.). Singapore: John Wiley & Sons.

Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organisation*. New York, NY: Doubleday.

Shan, W., Walker, G., & Kogut, B. (1994). Interfirm cooperation and startup innovation in the biotechnology industry. *Strategic Management Journal, 15*(5), 387-394.

Siguaw, J. A., Simpson, P. M., & Enz, C. A. (2006). Conceptualizing Innovation Orientation: A Framework for Study and Integration of Innovation Research. *Journal of Product Innovation Management, 23*(6), 556-574.

Silverman, D. (1973). Interview talk: Bringing off a research instrument. [Research methodology techniques]. *The Journal of the British Sociological Association, 7*(1), 31-48.

Smith, A. (2000). Casing the Joint: Case Study Methodology in VET Research at the Organisational Level. *Australian and New Zealand Journal of Vocational Education, 8*(1), 73-91.

Solow, R. (1957). Technical Change and the Aggregate Production Function. *Review of Economics and Statistics, 39*, 312-320.

Staples, M., & Niazi, M. (2007). Experiences using systematic review guidelines. *Journal of Systems and Software, 80*(9), 1425-1437.

Starbuck, W. H. (1985). Acting First and Then Thinking Later: Theory Versus Reality in Strategic Change. In J. M. P. a. Associates (Ed.), *Organisational Strategy and Change*. San Francisco: Jossey-Bass.

Tamura, S., Sheehan, J., Martinez, C., & Kergroach, S. (Eds.). (2005). *Promoting Innovation in Services*: OECD/RIETI

Tan, J., Fischer, E., Mitchell, R., & Phan, P. (2009). At the Center of the Action: Innovation and Technology Strategy Research in the Small Business Setting. [Article]. *Journal of Small Business Management, 47*(3), 233-262.

Thomson, A., & Gray, C. (1999). Determinants of management development in small businesses. *Journal of Small Business and Enterprise Development, 6*(2), 113 - 127.

Thorpe, D., Ryan, N., & Charles, M. B. (2009). Innovation and small residential builders: an Australian study. *Construction Innovation: Information, Process, Management, 9*(2), 184 - 200.

Thorpe, R., Holt, R., Macpherson, A., & Pittaway, L. (2005). Using knowledge within small and medium-sized firms: A systematic review of the evidence. *International Journal of Management Reviews, 7*(4), 257-281.

Thorpe, R., Holt, R., Macpherson, A., & Pittaway, L. (2006). *Studying the evolution of knowledge within small and medium-sized firms: a systematic review*. Coventry: Warwick business School, University of Warwick.

Tidd, J., Bessant, J., & Pavitt, K. (1997). *Managing for Innovation: Integrating technological. market and organisational change*. West Sussex, England: John Wiley & Sons Ltd.

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Academy of Management, 14*, 207-222.

Trewin, D., & Paterson, M. (2006). *Patterns of Innovation in Australian Businesses 2003*.

Veal, A. J. (1997). *Research Methods for Leisure and Tourism: A Practical Guide* (2nd ed.). Essex, England: Pearson Education Limited.

Verhees, F. J. H. M., Meulenberg, M. T. G., & Pennings, J. M. E. (2010). Performance expectations of small firms considering radical product innovation. *Journal of Business Research, 63*, 772-777.

Vermeulen, P. A. M., De Jong, J. P. J., & O'Shaughnessy, K. C. (2005). Identifying key determinants for new product introductions and firm performance in small service firms. *Service Industries Journal, 25*(5), 625-640.

von Hipple, E. (1988). *The Sources of Innovation*. New York, NY: Oxford University Press.

von Hipple, E. (2006). User Innovation. In B. Club (Ed.) (Transcript of Boss Club address ed., pp. 9). Sydney: Fairfax Business Media.

Wallendorf, M., & Brucks, M. (1993). Introspection in consumer research: implementations and implications. *Journal of Consumer Research, 21*(4), 719-722.

Wang, C., Walker, E. A., Redmond, J., & Breen, J. (2008). Making Plans. *Monash Business Review, 4*(2), 28-31.

Watson, T. J. (1997). Theorising Managerial Work: A Pragmatic Pluralist Approach to Interdisciplinary Research. *British Journal of Management, 8*, 3-8.

Webster, B., Walker, E., & Brown, A. (2005). Australian small business participation in training activities. *Education & Training, 47*(8/9), 552-561.

Weerawardena, J. (2000). *Small firm competitive strategy: A conceptual model and research propositions*. Paper presented at the ICSB World Coference.

Weerawardena, J. (2003). Exploring the role of market learning capability in competitive strategy. *European Journal of Marketing, 37*(3/4), 407 - 429.

Weerawardena, J. (2003). Innovation in Queensland Firms: Implications for the Smart State. *Queensland review (St. Lucia), 10*(1), 89-101.

Weiner, E., & Brown, A. (2005). A right-of-way strategy. *Strategy and Leadership, 33*(6), 21 - 24.

Weinzimmer, L. G., Michel, E. J., & Franczak, J. L. (2013). Strategic orientation and SME performance conceptual, operation and relational issues. *Journal of Business and Entrepreneurship, 24*(2), 21-46.

White, M. A., & Bruton, G. D. (2007). *The management of technology and innovation: a strategic approach*. Toronto, Ontario: Thomson South-Western.

Willmott, H. C. (1993). Breaking the paradigm mentality. *Organisation Studies, 14*(5), 681-719.

Wright, L. T., & Nancarrow, C. (2001). Improving marketing communication & innovation strategies in the small business context. *Small Business Economics, 16*(2), 113.

Wright, R. E., Palmer, J. C., & Perkins, D. (2005). Types of product innovations and small business performance in hostile and benign environments. *Journal of Small Business Strategy, 15*(2), 33.

Yin, R. K. (1991). Advancing Rigorous Methodologies: A Review of "Towards Rigor in Reviews of Multivocal Literatures...". *Review of Educational Research, 61*(3), 299-305.

Zahra, S. A., & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *The Academy of Management Review, 27*(2), 185-203.

Zikmund, W. G. (2003). *Business Research Methods* (7 ed.). Ohio: Thompson South Western.

Zimmerer, T. W., & Scarborough, N. M. (2005). *Essentials of entrepreneurship and small business management* (4th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Appendix 1: Journal listing of SLR papers

Table A.1 **Journal frequency of SLR study sample**

#	Journal Name	Total	%
1	Academy of Information and Management Sciences	1	*0.69*
2	Aslib Proceedings: New Information Perspectives	1	*0.69*
3	Australasian Accounting Business & Finance Journal	1	*0.69*
4	British Food Journal	1	*0.69*
5	Construction Innovation: Information, Process, Management	2	*1.38*
6	Decision Sciences	1	*0.69*
7	Education + Training	3	*2.07*
8	Entrepreneurship and Regional Development	1	*0.69*
9	Entrepreneurship Theory and Practice	2	*1.38*
10	European Journal of Marketing	2	*1.38*
11	European Business Review	1	*0.69*
12	European Journal of Information Systems	1	*0.69*
13	European Journal of Innovation Management	3	*2.07*
14	European Management Journal	1	*0.69*
15	Industrial Management & Data Systems	1	*0.69*
16	Industrial Marketing Management	1	*0.69*
17	Interfaces	1	*0.69*
18	Internet Research	1	*0.69*
19	International Business Review	1	*0.69*
20	International Journal of Contemporary Hospitality Management	1	*0.69*
21	International Journal of Entrepreneurial Behaviour & Research	3	*2.07*
22	International Journal of Human Resource Management	1	*0.69*
23	International Marketing Review	1	*0.69*
24	International Journal of Operations & Production Management	1	*0.69*
25	International Small Business Journal	2	*1.38*
26	Journal of Business Research	1	*0.69*
27	Journal of Business Strategy	1	*0.69*
28	Journal of Business Venturing	9	*6.21*
29	Journal of Cleaner Production	2	*1.38*
30	Journal of Computer Information Systems	2	*1.38*
31	Journal of Developmental Entrepreneurship	1	*0.69*
32	Journal of Enterprise Information Management	1	*0.69*
33	Journal of European Industrial Training	1	*0.69*
34	Journal of Global Information Management	1	*0.69*
35	Journal of High Technology Management Research	1	*0.69*
36	Journal of Knowledge Management	1	*0.69*
37	Journal of Operations Management	1	*0.69*
38	Journal of Product Innovation Management	1	*0.69*
39	Journal of Small Business and Enterprise Development	22	*15.17*
40	Journal of Small Business Management	9	*6.21*
41	Journal of Small Business Strategy	1	*0.69*
42	Journal of Strategy and Management	1	*0.69*
43	Journal of Workplace Learning	1	*0.69*
44	Knowledge and Process Management	1	*0.69*
45	Logistics Information Management	1	*0.69*

46	Long Range Planning	2	*1.38*
47	Management Decision	2	*1.38*
48	Management Dynamics	1	*0.69*
49	Management Research News	2	*1.38*
50	Management Science	1	*0.69*
51	Managing Service Quality	1	*0.69*
52	Marketing Intelligence & Planning	1	*0.69*
53	Measuring Business Excellence	1	*0.69*
54	New England Journal of Entrepreneurship	1	*0.69*
55	Omega	1	*0.69*
56	Qualitative Market Research: An International Journal	1	*0.69*
57	Small Business Economics	9	*6.21*
58	Strategic Change	2	*1.38*
59	Strategic Management Journal	3	*2.07*
60	Supply Chain Management: An International Journal	1	*0.69*
61	Technology Analysis & Strategic Management	1	*0.69*
62	Technological Forecasting and Social Change	1	*0.69*
63	The Business Review, Cambridge	1	*0.69*
64	The RAND Journal of Economics	1	*0.69*
65	Technovation	9	*6.21*
66	Tourism Management	1	*0.69*
67	Research Policy	4	*2.76*
68	Rural Sociology	1	*0.69*
69	World Patent Information	1	*0.69*
70	Academy of Marketing Science Review	1	*0.69*
71	Management Review	1	*0.69*

Appendix 2: SLR sample

Table A.2 **List of journal papers reviewed in SLR process**

Table 1

Authors	Article Title	Journal Name	Date	Vol (Issue)	Keywords	Abstract
Abbot, Jeong & Allen	The economic motivation for innovation in small construction companies	*Construction Innovation: Information, Process, Management*	2006	*6*(3)	Innovation Knowledge Motivation SMEs Transfer University collaboration	There is an increasing emphasis on the importance of innovation for the longterm economic success of businesses. At the same time the construction industry is characterized as being a poor innovator in comparison to other industries. If the university sector is to play a role in increasing innovation within construction companies it is necessary to for it to understand what the benefits and risks of innovation might be and what the motivation is for a business to adopt innovation. This paper attempts to develop answers to these questions through the analysis of a case study involving a small heating and plumbing company that embarked upon a performance improvement initiative and as a result implemented a number of innovative practices in its operations. Building upon on the results of this case study, suggestions for more effective collaboration between the university sector and industry are made.
Acs, Z.J.	Innovation and technical change in the U.S. steel industry	*Technovation*	1988	*7*(3)	Innovation Small business Flexible technologies Steel industry	The renewed interest in small business according to Piore and Sable (1984) is explained by the choice of technological modes that society faces today. This paper presents the evidence on the use of flexible-specialization technologies in the steel industry. After laying out the difference between mass production and flexible-specialization technologies, I explore the process of innovation in the steel industry in conjunction with the concept of flexible technologies. Finally, I examine the role played by management in bringing the new technology on line.
Acs & Audretsch	Innovation and firm size in manufacturing	*Technovation*	1988	*7*(3)	Innovation Small firms Large firms R&D	This paper examines the relationship between firm size and innovative activity. Utilizing newly published data from the U.S. Small Business Administration, we find that large firms prove to be more innovative in a number of industries, while

					Standard industrial classification	the opposite is true in others. We conclude that public policy promoting technological change should create environments which are conducive to small-firm innovation as well as large-firm innovation.
Archer, Wang & Kang	Barriers to the adoption of online supply chain solutions in small and medium enterprises	*Supply Chain Management: An International Journal*	2008	*13*(1)	Canada Small to medium-sized enterprises Supply chain management Surveys	The objective of this paper is to identify and measure the perceived importance of barriers in the SME community to the adoption of internet business procurement and supply chain solutions. This was a telephone survey of a sample of 173 Canadian small and medium-sized enterprises (SMEs), stratified by size of company (small and medium) and according to whether they were distributors, retailers or manufacturers. The data were analyzed statistically through an analysis of variance approach. Few differences were found between SME internet adopters and non-adopters. There is a need for education for all SME management on the benefits and drawbacks to using e-business solutions. Inter-organizational information systems that are required to link supply chain partners can be a serious barrier to online solutions. There is a significant dependency among supply chain partners in decisions on adopting online links. Flexibility, agility and ability of SMEs can help them to use partial e-business solutions for low volumes of business, but this approach can be very ineffective when transaction volumes are large. The results from this paper can help to direct future efforts to encourage SMEs to adopt e-business solutions. This study differs from other SME e-business adoption studies, in that it includes relationships with supply chain partners that play a large role in the adoption of innovative e-business solutions, transaction volumes which, for many SMEs that have not adopted e-business, may be too small to justify automated supply chain linkages, and transaction volumes with a company's biggest customer or supplier.
Audretsch, D.B.	Standing on the shoulders of midgets: The U.S. Small Business Innovation Research Program (SBIR)	*Small Business Economics*	2003	*20*(2)	Small business Research & development Federal funding Public policy Innovations High technology	The Small Business Innovation Research (SBIR) program in the US is one of the most important public policy programs, with a goal of generating innovative high-technology firms and promoting competitiveness and growth. The purpose of this paper is to describe the SBIR, explain why it has emerged as an important policy instrument, and provide an evaluation of the impact of the SBIR. The findings of this paper suggest

					Industrial economics	that the SBIR has generally accomplished its mission by contributing to the creation of high-technology small firms and enhancing US competitiveness.
Baard & Watts	Breaking the Paradox of Innovation in Small Businesses through Sustaining and Disruptive Reinvention	*Australasian Accounting Business & Finance Journal*	2007	*1*(2)	Innovations Small business Manufacturers Value chain Studies Organizational structure	In 2005 Deloitte Research released a paper examining the phenomenon they refer to as the 'innovation paradox': the inability or reluctance of manufacturing firms to pursue strategies that build the operational capabilities necessary for innovation that will provide both profitability and growth. The report claims that this is due to the rapidly increasing complexity of global markets and the lack of synchronising innovation efforts across their value chain, thus positioning the problem as an important contemporary issue. While the research did not specifically target small and medium enterprises, the implications for this business sector are considerable given their substantial contribution to global economies and their high failure rates in the first three to five years of operation. While not questioning the data in the Deloitte research, this paper does question the assumption that the phenomenon is irreversible and the apparent underlying self-fulfilling prophecy with respect to small to medium enterprises. To demonstrate this the authors draw on a case study of a small manufacturing company in rural New South Wales, Australia, which operated between 1889 and 1983, to show that the breaking of the innovation paradox was successfully achieved by this firm in the late nineteenth and early twentieth century. Applying the case study to the Deloitte model the study demonstrates contemporary similarities by overlaying the Laycock history on the successes/failures identified by Deloitte.
BarNir, Gallaugher & Auger	Business process digitization, strategy, and the impact of firm age and size: the case of the magazine publishing industry	*Journal of Business Venturing*	2003	*18*(6)	Small firms Large firms Firm size & age Internet digitisation Low-cost innovation	Despite increasing interest among researchers and practitioners in the field of Internet commerce, significant controversy remains regarding the large incumbent versus nimble newcomer dynamic. This paper explores issues related to firm age and size and the firm's propensity to engage in Internet-enabled process digitization by conducting an empirical investigation based on a sample of 150 firms in the magazine publishing industry. Results suggest that (a) differences exist as a function of firm age and size in the degree and manner in which firms digitize business processes through the Internet, (b) Internet-enabled digitization of

						business processes is associated with both strategies of innovation and of low cost, and (c) the digitization-strategy relationship is stronger for new versus established firms and for smaller versus larger firms.
Beaver, G.	Strategy and management in the smaller enterprise	*Strategic Change*	2002	*11*(4)		Editorial opinion piece
Beaver, G.	Small business: success and failure	*Strategic Change*	2003	*12*(3)		Editorial opinion piece
Beijerse, R. P. u.	Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs	*Journal of Knowledge Management*	2000	*4*(2)	Case studies Knowledge management Small-to-medium sized enterprises	This article deals with a field which gets little or no attention in the research done into knowledge management: small and medium-sized companies. In the first part of this article a conceptual model will be developed. This model can be used to analyse the most important knowledge management processes in companies. In the second part of the article our model is used to analyse 12 innovative companies from the industrial and business service sector. Knowledge management appears in small and medium-sized companies to get its form especially at an operational level. A total of 79 instruments were found with which knowledge is organised in practice: 18 instruments for determining the knowledge gap and for evaluating knowledge; 41 instruments for acquiring and developing knowledge; 20 instruments for knowledge sharing. On a strategic and tactical level there are provisions for knowledge management but they have not been developed as such.
Berry, M. M. J.	Technical entrepreneurship, strategic awareness and corporate transformation in small high-tech firms	*Technovation*	1996	*16*(9)	Small hi-tech firms Strategic orientation Entrepreneurship Innovation Technology	This paper presents the results of an empirical study of the management phenomenon underlying corporate transformation processes in small hightech firms. Within a few years of their foundation, small high-tech firms must evolve from a technology-driven to a market-led management philosophy. In order to support this transition towards a marketing orientation there must be a concurrent development in management practice within the organization if the firm is to survive and be successful in the long term. It is argued that firms are unlikely to achieve corporate transformation unless a strategic approach to managing the business and technology development is adopted. Significantly, firms that fail to evolve towards a market-led organization and a strategic orientation are those where management is dominated by technologists. It is concluded that the strategic awareness of the technical

						entrepreneur is a critical determinant of the firm's viability and achievements in the long term. It is further proposed that policy instruments should focus upon developing not only the technological base but also the general management and marketing skills base of small high-tech firms in order to ensure their continued effective contribution to innovation and international competitiveness.
Bessant, J.	The rise and fall of 'Supernet': a case study of technology transfer policy for smaller firms	*Research Policy,*	1999	*28*(6)	Technology transfer policy Small-sized enterprises Medium-sized enterprises Supernet	A dominant theme in innovation policy throughout the world has been the support of small- and medium-sized enterprises (SMEs). Although policy-making has been evolving away from simplistic and `universal' measures addressing all SMEs towards more targeted approaches, there is still a lack of knowledge about the nature and extent of SME support needs and the mechanisms for delivering it effectively. The result is that the policy environment is characterised by a wide range of experimentation; this paper reports on one such experiment--Supernet--aimed at improving the access of SMEs to major centres of technological excellence in the UK. During its two and a half years of operation Supernet largely succeeded in establishing a mechanism through which SMEs could access the extensive technology base of the UK. Its limitations were less in execution (indeed, overall management of the operation was generally well-regarded) than in positioning. As a stand-alone venture it was probably too specialised a service for the needs of many SMEs (although valuable for a few) but as part of a broad spectrum of innovation support it filled an important niche, complementing other, more locally oriented types of provision, particularly those being developed by the `Business Links' network. The paper reviews the history of Supernet and explores some of the issues that its implementation raises for innovation policy. In particular, it argues that there is a need for some form of managed network enabling access for SMEs to the technology infrastructure within a national system of innovation. It concludes with some thoughts on the design and operation of such a network based on lessons offered by the Supernet experience.
Bhaskaran, S.	Strategic experimentation and innovation in rural Australia	*British Food Journal*	2004	*106* (2)	Australia Business development Entrepreneurs	This article is a case study of a small-scale family enterprise which successfully introduced a new crop, adopted new farming methods, formed a research, development and

					Food crops Innovation Strategic management	marketing alliance with a major international company, and fostered R&D alliance with several government organisations. The study was completed through reviewing government, consultant and industry reports, and in-depth face-to-face interviews of key informants in industry and government. The findings showcase the importance of entrepreneurship (ingenuity to seize opportunities, effectively use personal contact networks, take risks, experiment through trial and error learning, adapt and, notwithstanding immense barriers, to continue with the venture) and a supportive national culture in fostering innovation and business development.
Bianchi & Bellini	Public policies for local networks of innovators	*Research Policy*	1991	*20*(5)	SMEs Innovation Local networks Innovation clusters Industrial districts Knowledge diffusion	A rich and heterogeneous literature has recently clarified the nature of agglomerations of small and medium-sized companies (industrial districts, flexible manufacturing networks) interacting in a territory and acting in the open market as efficient competitors against other forms of production organization, such as the traditional vertically integrated firm. Their ability to adjust to uncertain external conditions depends on the common culture and diffuse knowledge of the area, which is a sunk cost for those companies. In a policy perspective, the main question concerns the possibility of intervening in a specific context to stimulate the creation and growth of an agglomeration of companies i.e., to establish a "clan" of agents having a common interest in innovation. Technological knowledge will have to be provided as "club good" for the network. There are three elements to be considered in designing such a policy: (1) entry into (admission) and exit from (exclusion) the network; (2) promotion of a positive selection process of innovators within the network; (3) increasing the common knowledge and the specific learning characterizing the network. The aim of public interventions undertaken in the various regions of Europe, but also in several experiments in the US, can be seen as the constitution of "collective agents" or service centers, sponsored by the local public authorities and enterpreneurial associations, to manage collectively the cost of coordination of the entrepreneurial activities necessary for the formation and development of a local network of innovators. The new industrial policy approach of the European Community is explicitly oriented to supporting the local aggregation of new

						businesses, through the promotion of integrated plans of local intervention.
Boyle, E.	Entrepreneurship and the changing structure of estate agency in the UK	*Journal of Small Business and Enterprise Development*	1998	*5*(2)	Entrepreneurialism Estate agents Financial services Innovation UK	In the 1970s estate agency in the UK was a highly fragmented industry. Small, locally based, independent businesses dominated the industry. This industry structure meant that estate agency was seen as a typical entrepreneurial activity. By the first half of the 1990s, however, most estate agencies were in the hands of large institutions in the financial services sector, although recently independent estate agents have begun to reappear on the high street. Nevertheless the dramatic change in the character and structure of estate agency in the UK between the end of the 1970s and the present day raises a number of questions about the nature of entrepreneurship and its impact on industry development. In this paper the development of estate agency in the UK over the past 20 years is analysed, in order to ascertain, first, the relationship between an industries fragmentation and the existence of entrepreneurial opportunities within it, and, secondly, the extent to which the radical change in the industries structure during that period was the result of the exploitation of an entrepreneurial opportunity.
Brickau, Chaston & Mangles	Factors influencing the performance of SME food processing companies within the single European market	*International Business Review*	1994	*3*(2)	European Single Market Strategic Responses Food Processing Firms Small- and Medium-Size Enterprise Sector UK and Germany	The creation of the post-1992 European single market represents a significant change in the business environment confronting firms throughout Europe. Although there is extensive literature available on appropriate strategic responses to the single market scenario, very few of these writings contain guidance specifically related to the situation facing smaller firms. The objective of this study was to gain further understanding of which factors are likely to influence the performance of firms in the small and medium-size enterprise sector. This was achieved through a comparative study of approximately 200 UK and German small food processing firms. The major difference between UK and German companies are that the latter (i) identified a much broader range of factors which they believe will influence their performance and (ii) have adopted a strategic orientation towards managing those internal competencies necessary to sustain market performance over the longer term. In contrast UK owner/managers are mainly concerned with factors likely to affect short term financial performance. Viable strategic

						options for UK food processing companies seeking survival within the single market are discussed. It is concluded that these firms will need to adopt a strategy which places greater emphasis on the development of new, innovative products offering tangible differentiation based upon superior product performance. One possible way of implementing such a strategy is to create strategic alliances with other firms which can enhance internal capability and/or market management competency. A model is presented which might be utilised to determine how a strategic alliance could be used to improve a firm's strategic management capability within the post-1992 European market environment.
Brush & Chaganti	Businesses without glamour? an analysis of resources on performance by size and age in small service and retail firms	*Journal of Business Venturing*	1999	*14*(3)	Service & retail businesses SMEs Resource allocation Strategic planning Firm size & age	Research on factors influencing performance in new and small companies is extensive. Earlier work found that strategies (e.g. cost, quality, differentiation, etc.) affected performance contingent on industry conditions, the environment, and the entrepreneur's background. Although this work provides a solid basis for understanding differences in entrepreneurial performance, some firms are limited in their choices of strategy due to size, age, or industry. Often these firms are in industries where entry barriers are low and competitive advantages are easily imitated. Small service and retail businesses operate in sectors where these conditions are apparent. Comprising more than 50% of all small firms, they require minimal start-up investments but face intense competition. Lacking the "glamour" of high innovation/high growth firms, service and retail companies are at the "end" of the value chain, their fortunes rising and falling as a result of the direct influence of the owner-founder. Hence, performance variation may be better explained by the capabilities of the firm or individual competencies of the owner-founder, that is the resource-base and resource combinations, rather than strategy.
Burger-Helmchen, T.	Capabilities in small high-tech firms: a case of plural-entrepreneurship	*Journal of Small Business and Enterprise Development*	2009	*16*(3)	Entrepreneurialism Innovation Small enterprises	The purpose of this paper is to address the issue of evaluating the innovative/entrepreneurial capabilities of small firms in high-technology industries. The approach taken is a literature review and case study. The contribution of the paper is twofold: in the first part, it is tried to distinguish the different forms of entrepreneurship existing. This leads to determine a form of entrepreneurship, plural entrepreneurship, that is

						typical in high-tech start-ups. In the second part, it is then tried to evaluate the innovative/entrepreneurial capabilities of a firm in such a framework. This is based on a longitudinal case study of a high-tech start-up where we explore how different dimensions of entrepreneurship coexist and interplay to create a firm's innovative dynamics depending on its initial resources and those added during the firm's growth. The paper is an original attempt to distinguish different notions of entrepreneurship including the notion of plural-entrepreneurship and capabilities in a small enterprise.
Butler, Grice & Reed	Delimiting knowledge transfer from training	*Education + Training*	2006	*48*(8)	Agriculture Knowledge transfer Trust Vocational training	The purpose of this paper is to deepen the understanding of how and to whom knowledge is transferred from training to practice. Through recognising the interrelationship between knowledge, social network structure, and relational trust, social network methodology is applied to examine the importance of farmers' social networks in the process of knowledge transfer after engaging in learning through vocational training. The paper shows a synthesis of knowledge, social network structure and trust in relationships provides the basis for a tripartite model of knowledge transfer for which data was collected by conducting in-depth interviews. Using social network analysis this data maps the personal business networks of individuals that have participated in training explicitly detailing to whom knowledge has been transferred. The paper finds that farmers combine training with their tacit knowledge and through discussions with their family, and in some cases with professional contacts, new knowledge initiates various degrees of change within businesses. The familial, social and emotion attributes of business relations may determine the extent that knowledge is transferred in to practice. Creating a snapshot of knowledge transfer provides valuable insights into the flows of information within a business and how training is deployed. Furthermore, it provides pointers that to improve the injections of knowledge into small land-based businesses requires more focussed intervention than is currently emphasised on programme based support schemes. The paper shows that applying social network analysis to small agricultural businesses to examine knowledge transfer is in itself innovative, particularly as the research draws upon a

						peer-group of businesses enabling some comparisons to be made.
Butler, Reed & Grice	Vocational training: trust, talk and knowledge transfer in small businesses	*Journal of Small Business and Enterprise Development*	2007	*14*(2)	Knowledge transfer Small enterprises Social networks Trust United Kingdom Vocational training	Vocational training by those involved in small land-based businesses can lead to innovation as transferred knowledge may be applied to make marginal changes to enterprises or, in some cases, a major reorganisation of resources within a business. The purpose of this paper is to explore how knowledge is disseminated in personal business networks and how this is used in a very traditional industry. A synthesis of three interrelated concepts, those of knowledge, social network structure and trust in relationships, provides the basis for a tripartite model of knowledge transfer. Through conducting in-depth interviews, data are collected on each aspect of the model to map the structure of personal business networks, to provide qualitative data on the type of relationships that exist within these and to whom knowledge has been transferred. The emphasis on innovation through loose ties or the role of the outsider may not be an appropriate model for small land-based business. With the pre-dominance of strong ties and low flows of information, these businesses are unlikely to change either quickly or easily. Radical changes to business structure imply a more costly and focused intervention than the current emphasis on project and programme based support for rural businesses. Creating a snapshot of knowledge transfer occurring in small land-based businesses provides valuable insights into the flows of information within a business and how training is deployed. However, a longitudinal study would deepen understanding of how cumulative knowledge transfer is practically implemented. Applying social network analysis to small businesses to examine knowledge transfer is in itself innovative, particularly as the research draws upon a peer-group of businesses enabling some comparisons to be made.
Caniels & Romijn,	What works, and why, in business services provision for SME: insights from evolutionary theory	*Managing Service Quality*	2005	*15*(6)	Innovation Services Services marketing Small to medium-sized enterprises United Kingdom	Programmes providing services for small- and medium-sized enterprises are important. Yet, quality and impact of many of these programmes lag behind expectations. This paper attempts to shed light on the reasons behind this disappointing state of affairs. Modern theories of innovation and services marketing management are adopted as a conceptual framework, because these theories generate major insights

						about how business services should ideally be provided. The usefulness of this framework for analysing business service programmes is demonstrated through its application to one particular programme, the small business service (SBS) in the UK. Using this approach, the paper identifies several key issues. Major weaknesses in programme structure and implementation practices emerge, mainly revolving around customer focus, incentive problems and organisational issues, and the lack of a systems perspective. Given the suitability of the framework for the analysis of our case, it could also prove to be a promising tool for analysing business support programmes in other settings. Managerial priorities for improvement in the UK emerge. There is a need to improve the incentives facing boundary-spanning staff. This should be backed up by further organisational reform, to address the fragmentation plaguing the current system. The methodological approach, of viewing practice in a SBS programme through a theoretical lens, is novel. It could be a useful supplement to conventional performance and impact assessments that are more factual in nature.
Chaston, I.	Small firm performance: assessing the interaction between entrepreneurial style and organizational structure	*European Journal of Marketing*	1997	*31*(11)	Entrepreneurship Growth Marketing strategy Organizational structure Small-to-medium-sized enterprises	Poor marketing is widely accepted as one of the key reasons to explain success and failure of small firms. There is less agreement, however, about whether these types of business should adopt a classic strategic management approach to marketing. Some writers are now proposing that an entrepreneurial marketing style is more appropriate in the smaller firm. Although this concept is gaining acceptance, there apparently exists no quantitative evidence to support the hypothesis that an entrepreneurial style will definitely enhance the overall performance of the small firm. Covin and Slevin (1988) have tested this hypothesis for large firms in the USA. Presents a project which aims to repeat their study in the UK SME sector and gain further understanding of the relationship between performance, style, structure and organizational capabilities. Demonstrates that a move towards being more entrepreneurial and adopting an organic management structure may assist overall performance. Reinforces the view that it is probably not wise to recommend owner/ managers should adopt an entrepreneurial style without also advising them to implement concurrent consideration of the appropriateness of

						their current organizational structure. Discriminant function analysis suggests that style and organicity may influence internal organizational capabilities in areas such as innovation, employee productivity and the management of quality. Recognizes that the study was, however, unable in the SME sector to validate the Covin Slevin hypothesis that only two forms of organization (conservative/mechanistic and entrepreneurial/ organic) can achieve high overall performance.
Chen & Chen	Constructing Taiwanese Small-Enterprise Innovative Capital Indices by Using Fuzzy AHP	*The Business Review, Cambridge*	2007	*8*(2)	Studies Fuzzy logic Small business Innovations Intellectual capital	The purpose of this study is to explore the ways in which innovative capital is used to upgrade innovative operations in small enterprises in Taiwan. Based on the literature and related research, the study extracts two related dimensions-Invisible Innovation and Visible Innovation-of innovative capital fit to the characteristics of small enterprises. In addition, the hierarchical framework of innovative capital evaluation for small enterprises is constructed based on the two dimensions and the factors under each. Fuzzy Analytic Hierarchy Process (FAHP) methodology is used to analyze the opinions collected from a sample expert in small enterprises in Taiwan. The results of the present study found that the most important innovative capital indices for small enterprises are "Innovative culture" (0.378), "Number of New Designs" (0.370), "Copyright and Brand" (0.193), "Number of New Customers" (0.029), "Number of R&D Workers" (0.018), and "Outer Tech Connection" (0.013). A discussion of the key research findings and some suggested directions for future research are provided.
Chen & McQueen	Factors affecting E-commerce stages of growth in small Chinese firms in New Zealand: An analysis of adoption motivators and inhibitors	*Journal of Global Information Management*	2008	*16*(1)	Cross-cultural businesses Case studies E-commerce Small business New Zealand	We investigate an e-commerce stages of growth model in a cross-cultural business context for small Chinese fit-ins in New Zealand. Research findings from 14 case studies show that the Chinese owners/managers of these small firms have a high power distance, and their attitude toward e-commerce technology directly influences their firms' e-commerce growth process. It was found that the higher the stage of e-commerce adoption, the greater the need for owners having a more positive attitude toward e-commerce, more innovativeness and enthusiasm, and more technology literacy. The higher the tolerance for ambiguity and the higher the risk-taking propensity, the higher the stage of e-commerce adoption

						achieved. In addition, firms tit lower growth stages of e-commerce adoption are highly rated on individualism, while those firms at higher growth stages of commerce adoption arc, highly rated on collectivism. The research has implications for small business managers operating in a cross-cultural business context as they move through the different stage of e-commerce adoption.
Cooke & Wills	Small firms, social capital and the enhancement of business performance through innovation programmes	*Small Business Economics*	1999	*13*	SMEs Social capital Innovation capacity Innovation networks	The paper explores the extent to which social capital is advantageous to small and medium enterprise (SME) growth. Social capital is a communal property involving civic engagement, associational membership, high trust, reliability and reciprocity in social networks. It is capable of being identified in social, political and economic contexts, often associated with strong communities. However, not all strong communities exert the effects of social capital in respect of business activities. This paper assesses government programmes to promote collaboration amongst SMEs for improving innovation capacity by increasing social capital through networking. It shows that, for a sizeable proportion of programme-funded firms in Denmark, Ireland and Wales (U.K.) social capital building was associated with enhanced business, knowledge and innovation performance. Of particular importance was the opportunity afforded to firms for linkage with external innovation networks, and the build-up of embeddedness, or the institutional basis for the enhancement of social capital. As a consequence of discovering the advantages of social capital, over a third of respondents planned to continue to develop it in future, in many cases funding such activities privately rather than calling on the public purse.
Corbett & Campbell-Hunt	Grappling with a gusher! Manufacturing's response to business success in small and medium enterprises	*Journal of Operations Management*	2002	*20*(5)	Manufacturing strategy Flexibility SMEs Gusher New Zealand	This study examined how the operations in six New Zealand manufacturers responded to the turbulence in their business environment brought on by the success of their products. It was carried out in response to various calls in the business and operations strategies literature for more studies on how companies create configurations of capabilities that lead to competitive advantage, how these literature can be better integrated, and on internal fit within manufacturing. Case research and historiographic methods were used to record the competitive evolution of these firms. The study used semi-

						structured interviews with Chief Executive Officers (CEOs) and operations managers, analysis of company and public records and a manufacturing practices survey instrument. We suggest that when small and medium-sized enterprises (SMEs) are faced with sudden and dramatic success from an innovation, they need to focus the company's energy and resources on that product and its niche. Then, in terms of manufacturing strategy, the key attribute to develop is an operation that can produce short runs at little or no cost penalty, achieve requisite product variety, provide short manufacturing throughput times, and operate at high levels of quality and delivery dependability. We find that an approach that develops manufacturing capabilities that are related to market requirements is preferred to panacea-based approaches. Also, we see no common pattern in manufacturing capability development.
Corman, Perles & Yancini	Motivational Factors Influencing High-Technology Entrepreneurship	*Journal of Small Business Management*	1988	*26*(1)	Risk Perceptions Motivation Influence High technology Factors Entrepreneurs Characteristics Strategic planning High tech industries	Personal interviews are combined with secondary research to examine 22 high-technology companies and their founders. Traits of these entrepreneurs are compared with those in more classical and general models of entrepreneurship. High-tech entrepreneurial business ventures are those that the owner establishes and manages mainly to further intellectual and professional objectives. Although the venture need not be dominant in its field, it must employ innovative behavior. High-tech entrepreneurs usually have little or no past business experience and almost all have been associated in a research capacity with a university or research institute. A primary reason for forming the venture, rather than the profit motive, is the creation of an environment to fulfill the needs for control and independence. Both the high-tech entrepreneur and the top manager carry personal values into their business strategies.
Correia, I. M.	Small firms in Portuguese manufacturing: realising the potential in employment and technical efficiency	*Journal of Small Business and Enterprise Development*	2001	*8*(4)	Efficiency Employment Manufacturing Portugal Small firms	The objective of this paper is to assess the potential of Portuguese manufacturing firms with respect to two fundamental issues that have been at the core of important debates about comparative advantages of small firms and large ones: (1) Employment: Using a database compiled between 1982 and 1992, we analyse the contribution of small firms to job creation. This analysis aims to consider the different aspects of firm mobility: Entry, expansion,

						contraction and exit. The results indicate that, in the period considered, only small firms created employment and that this creation is mainly associated with the expansion of young firms located in the Littoral North and Centre regions of Portugal. Nevertheless, when we consider only small firms that are incumbents in all the period, results indicate that job creation is a feature specific to a small number of fast-growing small firms. The effects of the economic cycle were tested too, and it was found that employment creation by small firms is less sensitive to economic fluctuations, as reductions in employment in small firms do not seem to grow in crisis periods. (2) Technical efficiency: Independently from the job creation potential, it is important to evaluate whether small firms use economic resources in an efficient manner. To assess the efficiency of small businesses relative to large ones, we use plant-level information, thereby specifying and estimating a translog production model. This model allows estimating and comparing returns of scale and substituting elasticities for both small and large production units, covering a large number of six-digit sectors for the year 1995. Preliminary results suggest that: (I) There are significant differences in the production technology between large and small establishments; (ii) small establishments do not appear to be more flexible than large ones in factor substitution; (iii) large size is not a condition for efficiency in production. Therefore, considering the importance and weight small firms have upon the manufacturing industry employment volume, and the lack of any evidence regarding technical inefficiencies in the production, we may infer that small firms justify the public powers' attention, while designing and implementing policies which would support their survival as well as their growth. Such policies should enhance and refine their labour (and management) qualification techniques as well as design better strategies for disseminating information and new technologies. In fact, these policies would most certainly promote the development of Portuguese small firms, turning them into more innovating, flexible and competitive ones, even in those industries which traditionally comprise large firms.
Courseault Trumbach,	Technology mining for small	*Technological*	2006	*73*(8)	Small business	Successful small businesses effectively use outside

Payne & Kongthon	firms: Knowledge prospecting for competitive advantage	*Forecasting and Social Change*			SME High tech Innovation Technology mining Information flow	information. High tech small firms are designed to be flexible and innovative. They are often built upon a successful innovative product. These organizations are challenged to remain innovative in a fast-paced competitive environment. However, they face constraints due to the costs associated with the development of continuous innovation. This paper presents technology mining as a method to aid small firms in remaining knowledgeable about innovative ideas. In doing so, the authors present findings from a small high tech company whose issues are typical of other small high tech firms. Areas for improvement and recommendations to address those areas are also presented for review and further reflection.
Covin & Prescott	Strategies, styles, and structures of small product innovative firms in high and low technology industries	*The Journal of High Technology Management Research*	1990	*1*(1)	Strategic management High/low technology Small firms Gestalts Product innovators	The purpose of this study was to identify, compare, and contrast the strategic, managerial, and organizational contexts associated with product innovation among small firms in high and low technology industries. Results based on data collected from eighty-one firms indicate that, relative to low tech product innovators, high tech product innovators are more concerned with building market share, have more proactive competitive postures, are more inclined to take business-related risks, have more organic organization structures, rely to a greater extent on external financing, and are more concerned with creating a positive product image. Within the high and low tech subgroups, strategic profiles (gestalts) were developed to explore the various forms in which product innovators implement their strategies.
Davidsson, P.	Continued entrepreneurship: Ability, need, and opportunity as determinants of small firm growth	*Journal of Business Venturing*	1991	*6*(6)	Small firms Entrepreneurship Entrepreneurial determinants Growth factors Growth motivation model Sweden	The purpose of this research was to enhance our understanding of the growth or non-growth of individual small businesses, growth here being regarded as an indication of continued entrepreneurship. Taken together, earlier studies have suggested a very large number of determinants of entrepreneurship and growth. Yet no very strong explanatory factors emerge. It is argued here that all of the specific low-level explanatory variables that have previously been used can be regarded as aspects of either of three major determinants: Ability, Need, and Opportunity. A model based on these three major factors is developed, and the results of previous studies are reviewed in the light of this more abstract model. In the model, objective factors are separated from their subjective counterparts, and it is suggested that subjective factors--or

						reality-as-perceived--influence Growth Motivation and direct behavior. Although objective factors only partly determine subjective perceptions, they can have important direct effects on outcomes, i.e., Actual Growth. Using survey data from more than 400 Swedish small firms and applying Partial Least Squares analysis, which is a technique for analyzing structural relations among indirectly measured concepts, the parameters of the model are empirically estimated. The results largely lend support for the usefulness of the model. More specifically, the analyses suggest that: (1) objective measures of Ability, Need, and Opportunity can explain a substantial share of the variation in Actual (historical) Growth rates; (2) objective and subjective measures of these three factors can explain a substantial share of the variation in Growth Motivation; (3) in both cases, Need-related issues appear more important than Ability and Opportunity (which would mean that satiation is the major reason why small firms stop growing); (4) subjective factors contain growth-relevant information that is not captured by objective measures; (5) direct effects of objective variables on Actual Growth can be traced; (6) some relations are consistent whereas others seem to vary considerably across industries; and (7) while the model largely gains support, the analyses also suggest some additional relations that are theoretically reasonable and may deserve consideration in future studies. Finally, it is argued that for the advancement of entrepreneurship research, conceptual models at a higher level of abstraction like the one developed in this article are needed. Such models can add meaning to empirical facts and have the virtue of reducing complexity without assuming away too many potential contingencies. It is also suggested that entrepreneurship is a matter of degree and can show itself in different ways, such as start-up, growth, innovation, etc. In practice, the sole measure of entrepreneurship has often been a person's current status as being or not being the founder or owner-manager of a small firm. In future studies the use of a composite measure of the degree of entrepreneurship may prove more fruitful than the comparison-of-characteristics approach has been.
Davidsson, P.	Paul D. Reynolds: Entrepreneurship research	*Small Business Economics*	2005	*24*(4)	Nascent entrepreneur Business volatility	Paul Davidson Reynolds is the 2004 winner of the International Award for Entrepreneurship and Small Business

	innovator, coordinator, and disseminator				Entrepreneurship Economic development	Research. In this article Professor Reynolds' contributions are summarized in terms of four sets of triplets. The first is as innovator, coordinator and disseminator of novel and important empirical research studies. The second triplet concerns the main areas of his contributions: regional variations in entrepreneurial activity, nascent entrepreneurship and firms in gestation and international comparisons of the prevalence of entrepreneurial activity. The third set of triplets concerns what aspects of the research process he has contributed to: development of new empirical methods to research entrepreneurship; coining of new concepts that now permeate this field of research, and provision of important empirical results. The final set of triplets concerns the audiences to which Reynolds' research appeal: researchers, policy-makers and business practitioners. It is concluded that although his contributions are many and of different kinds, the single most important one is that his research has made it increasingly unreasonable to theorize and design research as if the economy essentially consisted of a relatively stable core of large, established firms and entry and exit of new firms were relatively infrequent, marginal and insignificant.
Dean, B. V.	The project-management approach in the "systematic management" of innovative start-up firms	*Journal of Business Venturing*	1986	*1*(2)	Project-management approach Start-up firms Innovative firms Project-management software California	This paper presents the principal results obtained by applying the project- management approach to strategic planning and operations management of innovative start-up firms' key activities. This approach is used to implement Drucker's view of entrepreneurship as a systematic discipline and his recommendation that innovation be treated using his principle of systematic innovation. As is well known, the management of growth in an innovative start-up firm is a difficult problem facing that organization. The fact that there exists no generally accepted approach that an entrepreneur can utilize, however, results in chaotic situations in many such enterprises. The start-up firm cannot utilize the formalized management systems and procedures available and useful in large firms. In addition, a disorganized, chaotic, random management-decision process will seldom provide desirable results in such firms. Viewing the firm as a project to be managed with specific tasks, activities, precedence relations, durations, and milestones presents an opportunity to utilize project-management techniques, including the critical-path method

						(CPM). Recent research has demonstrated that project-management methodology and its computer- software applications are applicable to small, innovative start-up firms. This methodology has been applied to 20 innovative start-up firms in northern California. Results indicate that the CEO and the entire management team are able to plan, schedule, and control the innovative start-up firm's multiplicity of activities in a systematic way. The firm is also able to modify its strategic plan based on a review of its updated status reports and to modify its operations plans accordingly. Current research is under way to develop similar systematic methods for managing innovations in large organizations.
Delmar & Wiklund	The effect of small business managers' growth motivation on firm growth: A longitudinal study	*Entrepreneurship Theory and Practice*	2008	*32*(3)	Small business Growth motivation Entrepreneurship Longitudinal study Sweden	This study addresses the role of small business managers' growth motivation for business growth, taking into account the important effects of previous motives and feedback from earlier performance. We hypothesize that small business managers' growth motivation has a unique influence on firm outcome measured as growth in sales and in number of employees. Data were gathered from two different Swedish samples of small firms using telephone interviews. Using cross-lagged regression analysis, we find support for our hypotheses when examining employment growth, but only partial support when examining sales.
Dewald & Bowen	Storm Clouds and Silver Linings: Responding to Disruptive Innovations Through Cognitive Resilience	*Entrepreneurship Theory and Practice*	2009	*33*(1)	Small firms Disruptive business models Innovation Risk experience	Incumbent firms facing disruptive business model innovations must decide whether to respond through inaction, resistance, adoption, or resilience. We focus on resilient responses to simultaneous perceived threat and opportunity by managers of small incumbent firms. Using cognitive framing arguments, we argue that risk experience moderates perceptions of opportunity, whereas perceived urgency moderates situation threat. We test our framework in the real estate brokerage context, where small incumbents face considerable challenges from disruptive business model innovations, such as discount brokers. Analysis of data from 126 real estate brokers broadly confirms our framework. We conclude with implications of our research for small business incumbents.
Dickson & Hadjimanolis	Innovation and networking amongst small manufacturing firms in Cyprus	*International Journal of Entrepreneurial Behaviour Research*	1998	*4*(1)	Innovation Management Networks Small firms	The practice of innovation management in Cyprus is investigated via case studies of innovative small manufacturing firms. The analysis concentrates on how Cypriot firms develop networks (or avoid them!) and the

						effects of network relationships on innovation performance. The behaviour of firms is related to two contrasting models of network development: First, the strategic network model where firms intentionally develop and maintain a network of long-term relationships based on trust, cooperation and mutual benefit, with a view to obtaining the necessary resources and knowledge for innovation. Second, the local self sufficiency model where firms obtain any required resources from other local firms through ˜arms length" market based transactions and any technical knowledge primarily from foreign suppliers. Such firms follow an insular pattern of behaviour in order to protect their independence and innovative activities. The possible association between performance (in terms of profitability, sales growth) and innovation strategies of Cypriot firms is examined and the implications for business managers and for Government support programmes are drawn out.
Discenza, J.H.	Using the small business innovation research program to turn your ideas into products	*Interfaces*	2002	*32*(2)	Small business Government agencies Funding Colleges & universities Guidelines	The Small Business Innovation Research Program helps small businesses transform new ideas into commercial products. The program provides an ideal means for businesses and universities to obtaining funding for cooperative projects. Rules and information for the program are readily available. Helpful hints are given to provide guidance.
Dodge, Fullerton & Robbins	Stage of the organizational life cycle and competition as mediators of problem perception for small businesses	*Strategic Management Journal*	1994	*15*(2)	Organisational life cycle Problem perception Small business	An empirical study based upon a sample of 645 small businesses assesses the relationship that life cycle stage and level of competition exhibit with the problems perceived to constrain small business strategic planning. Problems have been identified as either internal (cash flow) or external (competition); they have further been classified as either situational or core problems. Among the most prevalent problems reported by decision makers are customer contact, market knowledge, marketing planning, location, and adequacy of capital. A total of 16 problem areas were identified. Traditional wisdom offers the scenario where problems faced will vary as the organization progresses through the life cycle. Much of this research refutes conventional wisdom in that level of competition was determined to have more of an impact on problem perception.
Dodgson & Rothwell	Small firm policy in the U.K.	*Technovation*	1988	*7*(3)	Small firms Public policy	Public policy emphasis in the U.K. has moved to favour small firms, and towards creating a healthy and stimulating

					Technology transfer Innovation United Kingdom	environment rather than trying to influence directly the rate and direction of industrial and technological change. Different types of policy initiatives have been tried with varying degrees of success: the DTl schemes were amalgamated into the "Support for Business" programme, concerned with advice, innovation, investment and exports. Though specific technologies are being identified for support, and the MoD has increased its direct support for small firms, the authors argue that the U.K. Government's policies are piecemeal and luck true coherence as evidenced by the failure of innovation policies to redress the regional imbalances.
Doutriaux, J.	Growth pattern of academic entrepreneurial firms	*Journal of Business Venturing*	1987	*2*(4)	Academic entrepreneurship High technology Small business Innovation Growth patterns Canada	Academic entrepreneurship, the creation of new business ventures by university professors, technicians, or students, is increasingly being promoted by university-based innovation centers and university business offices. It is seen as an efficient university-industry technology transfer mechanism, and, in some cases may contribute to university revenue. Whereas most entrepreneurs leave the university at time of start-up, others keep their academic postings as full-time or part-time professors. "Part time" entrepreneurship may be interesting from a university point of view, because (i) it keeps in the laboratory a creative individual, (ii) it may provide through part-time academic positions for a more efficient use of university resources, and (iii) it encourages more contacts between faculty, students, and the business world. However, manufacturing firms led by part-time entrepreneurs do not seem to be as aggressive and growth-oriented as "independent" firms. The university professor interested in the successful transposition of an idea, an invention, to the commercial sector, may therefore have to do it through licensing, or resign from the university to devote all his time and energy to the development, manufacturing, and commercialization process. And the university interested in investing in a new "academic firm" created to exploit commercially an invention made in its own laboratories should beware of keeping the academic entrepreneur on staff, or, if he stays on staff, of involving him with the management of the new company. These are the main conclusions of a study of the evolution from 1980-1981 to 1984-1985 of 38 young firms originally created by entrepreneurs while at

						various universities in several Canadian provinces. The results, supported by the observation of a small control group of 8 Canadian high technology companies, bring out a dichotomy: for firms offering technical services. However, manufacturing firms completely independent from the university tend to g row faster. Other results support the negative correlation that seems to exist between the growth rate of sales and closeness to academic life, as measured, for example, by the use of university laboratories and equipment. Whether they are still closely connected to a university or not, the entrepreneurs in our sample do note many potential positive benefits from continuing contacts with the academic world. It is possible that the negative correlation between growth and university links observed in the sample results more from the individual characteristics of the entrepreneurs than from a negative influence by the university. As venture capitalists have long noticed, one of the main determinants of growth and success is the entrepreneur himself. The entrepreneurs staying close to the university and using university services may be less aggressive and less risk-oriented than the others.
During, W. E.	Project management and management of innovation in small industrial firms	*Technovation*	1986	*4*(4)	Small industrial firms Project management Innovation New product development	In innovation projects, three sub-processes have to evolve concurrently. These are problem solving, to bring about a new product or process; internal innovation diffusion, to disseminate information and engender a positive attitude towards new developments; and change in the organization so that it may function successfully with new products or processes. The characteristics of these sub-processes and a need for special roles relating to them were suggested by a study of the innovation processes in small companies. A case history shows the possible use of the processes and roles indicated above to manage innovation projects.
Dutta & Evrard	Information technology and organisation within European small enterprises	*European Management Journal*	1999	*17*(3)	Small enterprise Strategic management INSEAD Innovation Information technology European	Small enterprises (SE's) provide a major portion of the employment in most European countries. More than 90 per cent of the total number of European Union (EU) businesses are comprised of SE's, accounting for 25 per cent of EU turnover. This paper investigates the strategic management of information technology (IT) and organisation within European Small Enterprises (SE's). SE's in six different European countries/regions were included in the European Small

						Enterprise Information Technology (SEIT) study conducted at INSEAD: Benelux, France, Germany, Italy, Spain and the UK. The results show that European SE's have to innovate from both technological and organisational perspectives and build partnerships with other organisations in order to successfully address strategic opportunities and challenges.
Edelman, Brush & Manolova	The impact of human and organizational resources on small firm strategy	*Journal of Small Business and Enterprise Development*	2002	*9*(3)	Modelling Organizational structure Resources Small firms Strategy	Smaller less glamorous firms are more prevalent in the US economy than high-technology companies. These small firms are known for their inability to erect barriers to imitation, making the development of competitive advantage difficult. In our paper, we study the relationship between firm resources and firm strategies. Based on the contention that the quality of a firm's strategy cannot be judged independently of the firm resources on which it is based, we examine the relationship between firm resources and strategies in a cross-section of over 250 small firms. Our findings indicate that small less glamorous firms should follow strategies that bring them closer to their customers, rather than innovation strategies that may be more appropriate for their high-technology counterparts.
Ehrich & Billett	Learning new practices in small business: engagement and localised support	*Education + Training*	2004	*46* (8/9)	Australia Learning Small enterprises Working practices	Discusses the findings of a study that investigated how the learning of innovative practices might best proceed in small businesses. The recent implementation of the Goods and Service Tax (GST) in Australia presented an opportunity for understanding how small business operatives learned to implement a new practice. The procedures comprised semi-structured interviews with 30 small businesses about how they had learned about and implemented the GST. A case study was written about each small business' experience that were verified for their accuracy by each small business. These case studies became the data source. It was found that the small business operatives that appeared to have learned most about the GST were those who were highly engaged in the task of learning about the GST - active learners and also accessed high levels of support from localised sources. A typology comprising dimensions of support needed and engagement by small business operatives was synthesised from the findings and is discussed.
Ekanem, I.	Insider accounts: a qualitative research method for small	*Journal of Small Business and*	2007	*14*(1)	Decision-making Entrepreneurs	The purpose of this research is to present a detailed description of the qualitative research method adopted by the

	firms	*Enterprise Development*			Owner-managers Qualitative research Small enterprises	author in his doctoral research into the investment decision-making process in small manufacturing enterprises; and to inform small firm researchers generally, particularly those who may be considering the use of a qualitative research methodology for the first time in the study of processes of decision-making. "Insider accounts" is an innovative qualitative methodology, which involves in-depth, semi-structured interviews and direct observation, conducted longitudinally in a case study approach. It is a research method, which includes detailed accounts from the actors themselves, incorporating the actual motives and behaviour of owner-managers. It is based on a philosophy that the "objects" studied are in fact "subjects", producing accounts of their world. The finding in the study for which this methodology was used is that owner-managers predominantly use bootstrapping techniques for their investment appraisal rather than the more formal methods suggested in the financial management literature. So-called "objective" studies of decision-making process using questionnaires and positivist-type approaches, do little to help to answer the basic questions relating to how and why decisions are taken. Without answering these questions it is impossible to recommend how practices can become more effective. The study is limited to the extent to which it can be generalised to a wider population of small firms. The paper presents a detailed description of a qualitative research method, "insider accounts".
El-Namaki, M. S. S.	Small business--The myths and the reality	*Long Range Planning*	1990	*23*(4)	Small enterprise Entrepreneurial characteristics Small business policy Start-up barriers	The essence of the article is that small enterprise development efforts in many countries, should avoid commonly accepted fallacies and benefit from contemporary research finding as well as cross country experiences. The process should be looked at as a strategic effort where the policy frame is set as a response to identifiable constraints or barriers that impair the process of entry into business, continuity with the business functions and, eventually, decline or exit out of business altogether. The starting point is an analysis of common elements of misunderstanding or `fiction' within contemporary policies. Those are contrasted with findings drawn from contemporary research and country experiences. Both the `facts' and the `fiction' relate to entrepreneurial initiative, the contribution of small enterprise to employment, productivity,

						the added value of training, the entrepreneurs' business focus, learning and technological complexity, their role in export growth and the workings of the capital market. This is followed by an examination of the managerial barrier to small business development. Attention was first paid to specific barriers related to the managerial behaviour of the entrepreneur or the small business owner i.e. the dark side of his managerial behaviour, the slow learning and limited innovation, the vague notion of the long term, the selective approach to training and the limited ability to manage financial resources. Looking towards the future and considering the demands of the following decade, a few proposals are put forward. At the individual level are issues such as the strong side of the entrepreneur, the need for lower entry and survival barriers, for more incubators, for broader forms of entrepreneurship and for a richer enterprise culture.
Forbes, D. P.	Managerial determinants of decision speed in new ventures	*Strategic Management Journal*	2005	*26*(4)	Small start-up firms New ventures Internet businesses Decision speed Entrepreneurial experience	This study helps to explain why some new ventures make strategic decisions more quickly than others. Drawing on life course theory and human capital theory, I develop a model of how entrepreneurs' individual characteristics affect new venture decision speed. I test the model using survey data from 98 Internet startups and their founder/managers. Results show that firms made faster decisions when they were managed by older entrepreneurs and by those with prior entrepreneurial experience. In addition, exploratory analyses indicating that fast decision-making firms were more likely to close may indicate that prevailing theory in this area is contextually limited.
Forrest, J. E.	Strategic Alliances and the Small Technology-Based Firm	*Journal of Small Business Management*	1990	*28*(3)	Technology Small business Partnerships Joint ventures Innovations Alliances Strategic planning	In order to develop and sustain their technological competitiveness and to facilitate the rapid exploitation of their technologies, small technology-based firms (STBF) can use a variety of strategies. One such strategy involves the formation of strategic alliances. Certain alliances, such as university-research institute agreements, client-sponsored agreements, collaborative research and development agreements, inward technology licensing, and the formation of research and development limited partnerships can be used by the STBF to effectively develop and sustain its technological competitiveness. Alliances, such as manufacturing, marketing-distribution alliances, and outward technology licensing,

						enable firms to more quickly exploit their technological leadership. If care is taken in choosing a partner, negotiating the alliance, developing the alliance agreement, and managing the alliance, such alliances can be successful.
Foster, M. J.	Scenario planning for small businesses	*Long Range Planning*	1993	*26*(1)	Small business Scenario building Strategic planning Scenario analysis Risk reduction	Entrepreneurs are risk takers and innovators but are not always strong supporters of strategic planning, especially in smaller businesses. However, small business entrepreneurs, like everyone else, have to face up to the uncertainty inherent in the future. One key element of strategic planning is to devise ways to handle that uncertainty and a useful technique for this is scenario building. It is often assumed that scenario building is an approach which only large, wealthy organizations can use because of the time, cost and expertise involved. This article describes a simplified approach to scenario building which can be employed with benefit by even the smallest firms.
Georgellis, Joyce & Woods	Entrepreneurial action, innovation and business performance: the small independent business	*Journal of Small Business and Enterprise Development*	2000	*7*(1)	Entrepreneurialism Innovation Planning Small firms	Using a sample of some 300 small independent businesses, drawn from Central London, the paper examines how entrepreneurial behaviour affects business performance. It is argued that small businesses motivated by a desire to grow in terms of sales and/or employees and to survive in a dynamic and competitive environment need to be innovative. However, to what extent they will innovate successfully depends on their capacity to plan ahead, their capacity to innovate and their willingness to take risk. It is shown that entrepreneurial businesses are characterised by these competencies that allow them to innovate and thus develop and grow successfully. Not surprisingly, not all small businesses are equipped with these three competencies owing to their diverse array of strengths and weaknesses arising from the diversity in the managerial motives and aspirations of entrepreneurship. These results highlight the importance of the capacity to innovate and the capacity to plan ahead as strong predictors of small businesses' performance.
Golodner, A. M.	Antitrust, innovation, entrepreneurship and small business	*Small Business Economics*	2001	*16*	Small business Anticompetitive behaviour Antitrust enforcement Innovation Entrepreneurship	The purpose of this article is to discuss a few aspects of antitrust enforcement that are directly related to small businesses. The first point concerns how the antitrust laws work as an economic "charter of freedom" by protecting our economy from the misuse of market power by dominant firms, or from anticompetitive collusion by groups of firms, or from

						anticompetitive mergers, all of which can blunt the mainspring of our economic success - competitive markets. Second is an expansion on the first theme which focuses on how antitrust enforcement helps preserve two freedoms that I think small businesses care about very much: the freedom to engage in entrepreneurship, and the freedom to innovate. A final discussion involves a few recent cases recently seen at the Antitrust Division that illustrate the many ways in which antitrust enforcement has helped the small business marketplace.
Gray, C.	Entrepreneurship, resistance to change and growth in small firms	*Journal of Small Business and Enterprise Development*	2002	*9*(1)	Entrepreneurs Growth Innovation Small firms	The focus of this paper is on existing small firms, with fewer than 50 employees, and their attitudes to change, using data from regular quarterly small firm surveys conducted by the Small Business Research Trust, especially from the 1,212 respondents to the fourth quarter of 1999 (15:4, motivation, objectives and targets) and the 812 respondents to the first quarter 2000 survey (16:1, changes). The overlap between the respondents to these successive surveys allows their responses to be cross-tabulated. It was expected that there would be strong positive links between growth-orientation, the setting of financial objectives (as opposed to lifestyle goals), propensity to introduce changes and actual growth, and that age and size of firm effects will also be present and likely, as intervening variables, to influence these relationships. The findings confirm these expectations (and the mirror image of resistance to change linked to non-entrepreneurial performance).
Gray, C.	Absorptive capacity, knowledge management and innovation in entrepreneurial small firms	*International Journal of Entrepreneurial Behaviour & Research*	2006	*12*(6)	Entrepreneurialism Innovation Knowledge management Small enterprises	The purpose of this article is to explore SME capacity to absorb and manage knowledge as a prior condition to the successful adoption of innovations and entrepreneurial growth. Drawing on the findings from more than 1,500 SME owners across regular quarterly SERTeam surveys and from other large scale studies, this article examines the effects of experiential and formal knowledge on the development of SME absorptive capacity. There were significant age, educational and size effects that influence SME acquisition and assimilation of knowledge. Primarily, it is the small firms of 15+ employees that have the capacity to absorb and use new knowledge - especially those with higher educational levels and clear growth objectives. These firms are not start-

						ups but they do tend to be younger firms with younger founders. Given the main policy aim is the development of clusters and of knowledge-based firms, policy makers should focus on SMEs recently started by graduates or people with technical qualifications; educators need to develop technology and innovation management programmes for these firms. This article makes an important contribution to the identification of priorities for public SME development support and areas where business schools and enterprise trainers could maximise their economic and developmental impact.
Gudmundson,Tower & Hartman	Innovation in small businesses: Culture and ownership structure do matter	*Journal of Developmental Entrepreneurship*	2003	*8*(1)	Small business Studies Ownership Technological change Organizational structure Regression analysis Corporate culture	The empirical research presented in this article focuses on the relationships between ownership structure (family vs. non-family), the type of customer served by the business, several, dimensions of organizational culture and innovation in small businesses. The study posits that organizational culture, ownership structure and the type of customer are predictor variables for innovation. MANOVA and multiple regression were used in analyzing questionnaire data from 4264 individuals in 89 small businesses. The results indicate that initiation and implementation of innovation are related to aspects of culture and ownership. Organizational support was found to be more important for implementation than for initiation of innovation. Family businesses were found to have unique characteristics positively related to implementation. Finally, the cultural support for innovation was found to be related to the type of customer to which the firm sold and ownership structure
Hadjimanolis, A.	A resource-based view of innovativeness in small firms	*Technology Analysis & Strategic Management*	2000	*12*(2)	Studies Innovations Theory Small business Technological planning Strategic management Owner operator	The resource-based view is presented as the theoretical framework for empirical research on the determinants of technological innovativeness in small firms. These determinants include the characteristics of the owner/manager (O/M) and the firm and some technological assets (resources and capabilities). Evidence based on case studies is used for the evaluation of their effect on innovativeness and their interaction. The study highlights the key role of the O/M and the importance of some of his/her characteristics. It also shows the impact of certain resources and capabilities. The O/M emerges as the orchestrator of resource accumulation and capability development in the innovative firms.
Hinrichs, Gulespie &	Social Learning and	*Rural Sociology*	2004	*69*(1)	Small business	Retail farmers' markets are seen as key institutions in a more

Feenstra	Innovation at Retail Farmers' Markets				Entrepreneurship Social learning Rural marketplaces Innovation Enterprise characteristics	"civic agriculture," but little is known about how they promote small business entrepreneurship. Drawing on research in economic sociology and economic geography, this paper examines the role of social learning in vendor innovation. Data from a 1999 mail survey of farmers' market vendors in California, New York and Iowa show that business innovation, as represented by intensity of vendors' innovative marketing practices and vendors' successful enterprise expansion, was modest. Social learning through engagement with customers contributed to more innovative marketing by vendors, while social learning through engagement with customers and fellow vendors increased the likelihood of vendors diversifying to additional markets beyond the farmers' market. Certain individual and enterprise characteristics also influenced vendor innovation. This suggests that, although important, the beneficial effects of social learning for vendors at farmers' markets remain moderated by human capital and structural factors.
Howgrave-Graham & van Berkel	Assessment of cleaner production uptake: method development and trial with small businesses in Western Australia	*Journal of Cleaner Production*	2007	*15* (8/9)	Cleaner Production Eco-efficiency Australia, SMEs	This paper reports on the development of an innovative semi-quantitative assessment method to estimate the level of uptake of cleaner production (CP) in small to medium-sized enterprises (SMEs) on the basis of three component ratings: awareness of CP ideas and benefits; presence of management features and/or system components conducive to CP; and CP content of recent innovations and operational improvements. The assessment method was designed for application through a telephone survey and was deliberately structured to minimise intentional socially preferable responses. It was trialled on 140 SMEs in four sectors, mostly from Western Australia: printing and book making; dry-cleaning; food processing and metal products. The trial showed that the assessment tool can judge the business' capacity to implement CP. The levels of CP uptake found in the trial reflect well on the experience of CP practitioners, albeit much lower than reported from previous mail surveys. In the trial the drycleaners performed significantly better than the other businesses, with food processing, metal processing and printing businesses being ranked second, third, and fourth respectively. The higher uptake by drycleaners was expected given that a sector specific CP program was conducted in that

						sector. Overall, the results suggest that generic (non-industry specific) semi-quantitative proxy indicators can be used for estimating the level of CP uptake in SMEs. Although further verification with quantitative environmental and economic performance data would in principle be desirable, this would be impractical due to the general lack of monitoring and recordkeeping of environmental data in many SMEs, and would also face the common conceptual, methodological and fundamental challenges for CP quantification. The tool may therefore be more useful to target CP promotion efforts, and measure their effectiveness.
Hyland & Beckett	Engendering an innovative culture and maintaining operational balance	*Journal of Small Business and Enterprise Development*	2005	*12*(3)	Australia Innovation Leadership Organizational culture Organizational development Partnership	This paper aims to identify key elements of innovative culture using innovation audit tools. The research seeks to determine if factors such as the ability to collaborate are important in building a culture that supports innovation. Many firms are continually scanning the environment for sources of ideas for product or service innovations. to realise benefits from these practices, organisations need a culture that supports collaborations and a systematic approach to man work and uses the two cases studies to highlight some of the benefits of collaboration. The key role of leadership in the two cases is noted, however not all aspects of innovation culture are considered in these case studies and further research needs to consider different forms of ownership and governance. Collaboration supported by creative leadership can give small firms a competitive innovative edge, small businesses seeking to be innovative need to understand the importance of leadership and collaboration. Innovative organisations require a set of competences and capacities that enable them to win new business, these may be located within the organisation or they can be accessed externally. This research considers two case studies and provides examples of characteristics of innovation cultures but the findings may not be generalisable to a wider population. The values that create an organisational culture and supports and encourages innovation needs to be embedded in the organisation.
Johnston, Hamilton & Zhang	Learning through Engaging with Higher Education Institutions: A Small Business Perspective	*International Small Business Journal*	2008	*26*(6)	SMEs Higher education institutions (HEIs) SMEs-HEIs	Abstract omitted – Paper was an introduction to a Special Issue.

					partnerships Innovation Collaboration	
Jones, C.	An alternative view of small firm adaptation.	*Journal of Small Business and Enterprise Development*	2004	*11*(3)	Learning organizations Market orientation Small enterprises	Increasingly, small firms with a history tied to a specific geographic location are having their survival threatened by new and innovative Web-based entrants. This paper considers the plight of such firms and proposes an alternative means to reflect on how they may or may not learn about such threats or opportunities. Adopting an evolutionary perspective, the construct absorptive capacity is used to highlight the deficiencies of current market orientation theory to explain the process of firm learning. The conceptual model of evolutionary potential provides a framework through which both the firm and its owners'/owner's abilities to learn can be taken into account.
Jones, J. T.	The determinants of training in Australian manufacturing SMEs	*Education + Training*	2005	*47* (8/9)	Australia Business development Manufacturing industries Small to medium-sized enterprises Training	The purpose of this article is to examine the factors influencing the provision of increased training in Australian manufacturing small and medium-sized enterprises (SMEs) that have embarked upon different growth development pathways. The longitudinal panel data employed in this research are drawn from the business longitudinal survey conducted by the Australian Bureau of Statistics over the four financial years 1994-1995 to 1997-1998.The results indicate that organisational change, in the form of major change in production technology and/or new or substantially improved product or process technology, and the introduction of business improvement programmes, are influential, and relatively consistent drivers of increased training in SMEs following each of the growth development pathways, and, over time. The findings also suggest that innovation distinguishes high growth SMEs from their lower growth counterparts. This investigation used a single item measure of training. Future research could utilise multi-dimensional measures of training. The findings suggest that the reasons SMEs provide training depend closely on the particular business needs of relevance to the enterprise, and as such, may be of interest to policy-makers. To date, there has been a paucity of research examining the demand side of SME training. The study focuses exclusively on SMEs that have embarked upon different growth development pathways, and

						adopts a longitudinal research design, enabling the study of the determinants of training over time, in SMEs exhibiting different levels of business growth.
Jones & Crompton	Enterprise logic and small firms: a model of authentic entrepreneurial leadership	*Journal of Strategy and Management*	2009	*2*(4)	Entrepreneurialism Leadership Owner-managers Small enterprises Social skills	The purpose of this paper is to draw on emerging ideas related to the concept of entrepreneurial leadership which emphasises a "distributed" model synonymous with terms which indicate that authority is decentralised ("shared", "team", "democratic", "representative" and "dispersed"). A model of authentic entrepreneurial leadership was developed based on a review of the literature. Eight small manufacturing companies were selected to empirically examine, via interviews, the extent to which authentic entrepreneurial leadership was adopted by owner-managers. Interviews with owner-managers indicated that they did in fact rely on an approach to leadership which emphasised the role of employees as genuine stakeholders in the business. This finding can be related to the concept of what Dovey and Fenech, describe as "enterprise logic" which the authors link to the emergence of knowledge-based capitalism. Owner-managers were keen to involve their employees in development of the businesses through the development of new products and new services. This study confirms earlier work which points out the importance of entrepreneurs adopting an authentic approach to leadership. Authentic leadership means that employees are encouraged to develop their individual strengths and owner-managers adopt an ethical approach to their dealings with all stakeholders. The paper develops a model of entrepreneurial leadership which sets out the links to organizational innovation. The empirical study provides clear evidence of links between this approach to management and higher levels of innovation within small firms.
Joynt & Welch	Strategy for Small Business Internationalisation	*International Marketing Review*	1985	*2*(3)	Small business groups International competitiveness Collaboration Innovation	In this article a new Norwegian approach to assisting small companies to develop international operations is examined. The aim of the scheme is, gradually, to mould groups of small companies with related products into separate entities which serve as vehicles for international market entry. An outside consultant is responsible for guiding and supporting each group's activities. In addition, the market entry process is buttressed by a range of sponsor organisations. While the scheme has had mixed success so far, it is indicative of the

						scope for innovation in assisting many small firms with unexploited potential for international operations.
Julien, P.-A.	New technologies and technological information in small businesses	*Journal of Business Venturing*	1995	*10*(6)	Small business Innovation capacity Technology transfer Competitive advantage Large business techniques	The use of new management and production technologies is essential for most small businesses if they are to improve their competitiveness and thus face up to increasing national and international competition. This presupposes access to scientific, innovative, and technological information, making firms aware of developments in technology and the resources available for obtaining and using the technology correctly. Many authors have already shown that small businesses lag far behind large firms in their use of new technologies. Some reasons put forward to explain this include the more generally limited resources of small firms and a national structure for the production and transfer of new information that is poorly adapted to small business needs. However, assuming that some gap between small and large firms actually exists, how can we explain that most small firms nevertheless not only survive, often for a very long time, but also produce a return comparable to large firms? One way of doing this is to study the situation of small businesses by using methods adapted to the small business sector and not developed for large firms. It is important to analyze not only the characteristics of the firms themselves, but also what they do to become competitive. Our own research in the small business field has shown that the lag in terms of new computer technologies has decreased considerably in recent years, and also that it tends to be smaller in many industries if specific advanced technologies are added. The perspective also changes if we examine the innovation capacity of small business, and its ability to develop niches or to work on smaller and more specific markets. The same applies to technological watch. An inquiry following a case study shows that small firms use different channels according to their objectives and turn to networks to overcome the limits of the information transfer system they use. They evaluate information by comparing different sources, and they use iterative techniques and intuition to complete their information and to decide on their investments. New technology acquisition by small and large firms cannot be compared; for small firms, it is an entrepreneurial act that in no way resembles the behavior of larger firms. However, to

						understand small businesses, further research is required into their behavior in different kinds of decision-making situations. To do this, we need tools developed specifically for the small business sector, free of any presumption of the supposedly better performance of large-scale production.
Jutla, Bodorik & Dhaliwal	Supporting the e-business readiness of small and medium-sized enterprises: approaches and metrics	*Internet Research*	2002	*12*(2)	Business development Central government Infrastructure Internet Small-to-medium sized enterprises	Government initiatives are continuously being designed to create stable and supportive environments for developing new industries. Presents a conceptual model for use by governments in creating and sustaining an appropriate climate that facilitates the national adoption of e-business. It focuses specifically on the needs of small and medium-sized enterprises (SMEs). Also suggests six categories of e-business readiness metrics and measures to be used for assessing how a country is performing in terms of providing a positive e-business readiness climate. Examples of innovative initiatives are provided from Canada, The Netherlands, Norway, and Singapore. Concludes that a balance among attention to infrastructure components has not yet been achieved in these countries.
Kajanus, M.	A model for creating innovative strategies for an enterprise and its application to a rural enterprise	*Management Decision*	2000	*38*(10)	Creativity Resources Rural economy Strategy Value analysis	Innovations are argued to be one of the main sources of sustainable competitive advantage. This study presents a model for creating ideas and formulating them into strategic alternatives for an enterprise. Value-focused thinking, including clearly defining and structuring the fundamental values of an enterprise in terms of objectives and using those objectives to guide and integrate decision making, offered the main line for the model. The model clarifies the information about the factors impacting on the situation under study and stimulates thought and communication within the group participating in planning. An application of the model was constructed and applied to a small enterprise involved in agriculture, forestry and subsidiary business.
Kalafsky, R. V.	Export activity and firm size: an examination of the machine tool sector	*Journal of Small Business and Enterprise Development*	2004	*11*(2)	Exports Innovation Machine tools Manufacturing industries	This paper examines the relationship between firm size and export performance within the US machine tool (MT) industry, a sector comprised primarily of SMEs. Evidence for this analysis is taken from the results of a postal survey of 82 MT exporters representing a cross-section of company size, product lines, and geographic location. Among these manufacturers, firm size fails to correlate with export-intensity or export growth. However, the results suggest relationships

						between firm size and the degree of importance accorded to several problems impacting the MT sector, such as access to export finance and declining local markets. Overall, smaller MT producers do not face major impediments to export activity. Instead, specialization and market niche appear to be important. The paper concludes with a discussion of future growth prospects and competitive issues for these manufacturers.
Kanter, R.	Supporting innovation and venture development in established companies	*Journal of Business Venturing*	1985	*1*(1)	Venture development Small business units Strategic management Entrepreneurial management Leadership Innovation	Accumulated research findings call into question the ability of established corporations to develop and manage new ventures successfully. This article argues that the problem comes in large part from failing to differentiate between the requirements of administrative management--geared to managing existing activities and holding things in place to ensure continuation of already-developed activities--and the requirements of entrepreneurial management--designed to create change by developing something new. The two kinds of management are in tension and may interfere with each other, but every established organization needs both in order to get both innovation and efficiency. Innovations and new ventures have four particular characteristics that account for their special management requirements: uncertainty, knowledge-intensivity, competition with alternative courses of action, and boundary-crossing. Thus entrepreneurial management to support creation of the new puts a stress on such features as visionary leadership, "patient money," planning flexibility, team continuity/stability, and interfunctional cooperation. But the usual requirements of administrative management in established corporations contradict these principles. Thus some companies try to set their new ventures apart from the old to avoid conflicts in management requirements. However, this this only partially solves the problem. All companies need both to manage ongoing activities and to create new ones--with the proportions of each depending on the nature of the business. They need to strike a balance between administrative and entrepreneurial management. The problem of venture development in established corporations occurs when administrative management comes to dominate and innovation is not valued sufficiently. The command system of administrative management needs to be replaced by a mutual

						adjustment system. High innovation companies build mutual adjustment into their design. They allow flexibility to move into an entrepreneurial mode. They are characterized by broader jobs: structures built around small business units or functionally complete project teams; cultures stressing the ability of people to contribute more over time; and easy access to the key "power tools" of information, support, and resources. A more entrepreneurial corporation minimizes hard-and-fast rules and procedures governed by a rigidly defined command structure and emphasizes instead flexibility and broadly-skilled sets of employees in flexible units that can be grouped or regrouped as changing circumstances require. Large corporations must institute deliberate programs to encourage innovation and entrepreneurship, including removing the roadblocks of unnecessary administrative requirements; encouraging integration across departments and functions: changing budgeting and accounting procedures and providing internal venture capital and special project funds; discretionary time; and new business performance measures.
Kenney, M.	Schumpeterian innovation and entrepreneurs in capitalism: A case study of the U.S. biotechnology industry	*Research Policy*	1986	*15*(1)	Biotechnology Small firms Schumpeter Theory of Economic Development Business cycles Cooperative tensions Innovation	This paper uses the theoretical framework developed by Joseph Schumpeter to examine the first ten years of the U.S. biotechnology industry. The role of the entrepreneur, scientist/inventor, manager and capitalist are distinguished. There is a discussion of the obstacles the small firms have had to overcome to create a "New Economic Space" in the marketplace. It is argued that the earlier Schumpeter of The Theory of Economic Development and Business Cycles emphasizing the role of small firms more accurately describes the U.S. biotechnology industry in 1985, than Schumpeter's later work Capitalism, Socialism and Democracy which postulated that the large established firms have preempted the role of small firms in innovation. A discussion of the role of large established firms and the small entrepreneurial firms presents the tensions inherent in the "cooperative" arrangements between these two types of business enterprises. The role of small biotechnology firms in reducing these innovations to practice and in their ability to continue to grow demonstrates that the independent entrepreneur recognized by the early Schumpeter has been very active in the biotechnology industry.

Keskin, H.	Market orientation, learning orientation, and innovation capabilities in SMEs: An extended model	*European Journal of Innovation Management*	2006	*9*(4)	Innovation Learning Learning organizations Market orientation Small to medium-sized enterprises Turkey	The purpose of this paper is to examine the nomological relations among market-orientation, learning-orientation and innovativeness in medium-sized business (SMEs) of developing countries. The study involves a questionnaire-based survey of managers from small-sized-firms operating in Turkey. A total of 157 usable questionnaires were received from managers. These were subjected to a structural equation modelling (SEM) analysis. The results show that firm innovativeness positively affects firm performance; firm learning-orientation positively influences firm innovativeness; firm market-orientation positively impacts firm learning orientation; firm learning-orientation mediates the relationship between firm market-orientation and firm innovativeness; and firm market-orientation indirectly impacts firm performance via firm innovativeness and learning. This study has implications for SEMs aiming at increasing their performance and innovativeness. The interrelationships among a firm's market-orientation, learning-orientation, and innovativeness are an important research area for investigators in the literature of management, strategy, and marketing. However, most of the empirical studies were conducted in large-scale firms in developed countries and ignored small and medium-sized business (SMEs) in general, and in developing countries in particular. The results offer both theoretical and managerial implications.
Khan & Manopichetwattana	Innovative And Noninnovative Small Firms: Types And Characteristics	*Management Science*	1989	*35*(5)	Studies Small business Innovations Hypotheses Entrepreneurs Characteristics	The theory that the characteristics of innovative and noninnovative small firms have significant differences is addressed. The study is based on a sample of 50 Texas manufacturers. Cluster analysis yielded 5 distinct groups. Of the 2 innovative groups, one type was young firms and the other was established, managerially competent firms headed by newcomers. Of the 3 noninnovative groups, one type survived on past success and one displayed continuing managerial effort but was led by executives who had been at the helm far longer than average. The 3rd group showed lesser competence and effort, was highly centralized, and was headed by executives leaning toward an external locus of control. Correctional analysis indicated a significant positive relationship between scanning and innovation. Challenges to the firm in the form of environmental dynamism and

						heterogeneity evoked positive innovative responses, but environmental hostility was a weak negative correlate inducing the firm to pull back. An abundance of resources encouraged proactiveness.
Kickul & Gundry	Transforming the Entrepreneurial Landscape: Emergent Innovative Behaviours in Internet Firms	*New England Journal of Entrepreneurship*	2000	*3*(1)	E- businesses Small Business Innovation Entrepreneurial characteristics Strategic orientation	Our study proposed and tested an entrepreneurial process model that examined the interrelationships among a small firm owner's personality, strategic orientation, and innovation. In the first part of the model, it was posited that a proactive personality would directly influence a prospector strategic orientation. This type of strategic orientation would then be a key factor in determining the type of innovations introduced and implemented within the business. Using a sample of 107 small business owners, results revealed that the prospector strategy orientation mediated the relationship between proactive personality and three types of innovations: innovative targeting processes, innovative organizational systems, and innovative boundary supports. Implications for small business managers as well as future research directions are discussed.
Kickul & Gundry	Prospecting for strategic advantage: The proactive entrepreneurial personality and small firm innovation	*Journal of Small Business Management*	2002	*40*(2)	E- businesses Netpreneurship model Innovation Entrepreneurship Strategic orientation	The electronic marketplace presents an extraordinarily challenging environment for product and service development, and will necessitate the development of alternative entrepreneurship models. Internet entrepreneurial teams can be characterised by their orientation toward values of rapid change and innovation. This article reports on a study of innovative behaviour in which 131 internet entrepreneurs were engaged, and six distinct innovation activities emerged. Implications for opportunity identification, alliance formation, and strategic orientation of internet entrepreneurs are presented as preliminary steps toward a new "netpreneurship" model of business formation
Kitching & Blackburn	Intellectual property management in the small and medium enterprise (SME)	*Journal of Small Business and Enterprise Development*	1998	*5*(4)	Innovation Intellectual property Legal title Small- to medium-sized enterprises	Intellectual, as opposed to physical and financial, capital is increasingly regarded as a source of competitive advantage for individuals, enterprises and nations. Small and medium enterprises (SMEs) are often regarded as important innovators in the economy. It is possible to protect some intellectual capital as property through formal legal rights such as patents or copyright or through contractual agreements. Where small businesses possess such intellectual property, they can secure legal protection. Business owners may also attempt to protect

						such property using informal methods such as keeping information confidential as "trade secrets". To explore whether SMEs possess intellectual property and, if so, whether they attempt to protect it, results are presented from a study of SMEs in four sectors where such issues are likely to arise - computer services, design, electronics and mechanical engineering. Overall, small business owners placed most emphasis on informal methods to protect intellectual property. These methods were more familiar, cheaper, less time-consuming and frequently considered as effective as more formal rights. Under most circumstances, SME owners considered formal registrable rights such as patents less important. Even where business owners adopted formal rights, they were generally reluctant to bring a legal action to obtain redress where they believed that infringements had taken place.
Kropp & Zolin	Technological Entrepreneurship and Small Business Innovation Research Programs	*Academy of Marketing Science Review*	2005	*7*	Entrepreneurship Entrepreneurial orientation Technological entrepreneurs Technology development and commercialisation SBIR program Commercial Ready program Government support Start-up technology firms	The development and commercialization of new technologies are important to the global economy. New product technologies can revitalize old industries or create entirely new industries. New process technologies can streamline production and increase efficiency. High-tech start-ups and technology development firms, also known as technological entrepreneurs, play an important role in developing and commercializing the technologies, especially in artificial intelligence, biotechnology, software, and the telecommunications industry (Zahra 1996a). As technology adopters, they use new technologies for product and process innovation; as technology developers, they initiate the commercialization of new technologies (Clarysse and Moray 2004). Though they may be idea rich, technological entrepreneurs are typically are resource poor , often lacking the operating capital to intensively research an interesting idea, to develop the idea into a prototype, and/or to commercialize the product. Government involvement in early stages of technological development can provide the boost necessary to launch the technology and to develop an industry. Although there are a number of significant government programs to assist technological development in many countries, including the Commercial Ready program in Australia, Malaysia's

						Multimedia Super Corridor, and the Vinnova programs in Sweden, our initial focus is on the Small Business and Innovation Research (SBIR) program, in the United States. The SBIR program operates in ten Federal government departments and agencies and typically funds over $1 billion in technology development programs annually. A better understanding of its role in the process of assisting technology entrepreneurs in developing and commercializing technology could help governments in other countries develop programs that will assist technological entrepreneurship. Using a model developed by Lumpkin and Dess (1996), this paper explores the conceptual role that government technology programs can play in facilitating the process of technological entrepreneurship. It examines the relationships between the components of a firm's entrepreneurial orientation and the firm's willingness to participate in the SBIR program. It also explores some of the ways SBIR funding can impact the environmental factors in which the firm operates. Finally it explores some of the ways participation in the SBIR program can impact a firm's organizational structure, and, ultimately, the firm's performance. Entrepreneurial Orientation refers to the organizational processes, methods, styles, practices, and decision-making activities employed by entrepreneurs that lead to new entry (Lumpkin and Dess 1996, 2001; Stevenson and Jarillo 1990). Lumpkin and Dess (1996) identify five components of an entrepreneurial orientation: autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness. Environmental factors include dynamism, munificence, complexity, and industry characteristics. Organizational factors include size, structure, strategy, strategy-making processes, culture, and top management team characteristics. We extend organizational factors to also include the effect of firm resources. We expand the performance measures mentioned by Lumpkin and Dess (1996) - sales growth, market share, profitability, overall performance, and stakeholder satisfaction - to explicitly include commercialization, technology transfer, and survival. A series of propositions is developed for entrepreneurial orientation and the willingness to participate in a program like

						SBIR, albeit, in the United States or in other countries. There are direct positive relationships between willingness to participate in SBIR and innovativeness, proactiveness, and competitive aggressiveness. As participation in a government program can be seen to offer easier access to venture capital in exchange for compliance with regulations, we posit inverse relationships between willingness to participate and the autonomy and risk-taking components of an entrepr neurial orientation. A series of propositions is developed for the relationship between SBIR and environmental factors: SBIR can have positive effects on dynamism if the innovations funded are radical in nature; can positively affect munificence if the industry is tightly defined, and can enhance industry competitiveness. In turn, these changes in environment will make it more likely that a technology entrepreneur will develop and commercialize a technology. Although participation in a program like SBIR can impact many of the organizational factors, we posit that the biggest direct impact of SBIR is to enhance firm resources. The impact of SBIR on other components of the organizational factors will be indirect, through firm resources. Survival rates, rates of commercialization, and rates of technology transfer are posited to be higher for technology firms that participate in programs such as SBIR than for comparable firms which do not participate in the programs. Future research directions are discussed. This article is propositional in nature. It is also the basis for on-going empirical work, designed to test the conceptual model presented. The focus on this paper has been to examine the role that SBIR might play in assisting technological development, specifically in researching new technologies, developing prototypes, and commercializing the sponsored innovations. In addition it is intended to provide a foundation for researchers to explore other technology development programs, both in the United States and in other countries. An analysis and implementation of programs like the SBIR program in the United States, Malaysia's Multimedia Super Corridor, the Vinnova programs, in Sweden, and the Commercial Ready program in Australia, offer the potential to help entrepreneurs commercialize new technology in other countries. It might be particularly interesting to learn how

						informal programs or social initiatives may play a similar role in countries where government programs of this magnitude are not available. For example, it would be interesting to explore the role that quasi-government programs, such as technology parks, might play in helping commercialize technology. It would also be interesting to explore the role government programs play in more directed economies.
Laforet & Tann	Innovative characteristics of small manufacturing firms	*Journal of Small Business and Enterprise Development*	2006	*13*(3)	Innovation Manufacturing systems Small to medium-sized enterprises	The purpose of the paper is two-fold: one, to focus on a specific industry - the manufacturing industry. In response to recent criticisms research in small to medium-sized enterprises (SME) is not sector/industry-specific, consequently the advice for these companies was too general and not of any particular help. Two, the research addresses innovation management in terms of the interrelationship among the three elements of a business: product, process and ways of working, which were often explored in isolation in the literature. Similarly, a definition of innovation was established and a systematic approach to company innovativeness was adopted. A survey of 1000 West-Midlands-based manufacturing SMEs (SMMEs) was conducted. Ten indicators were used to measure company innovativeness. The top 20 per cent firms were compared with bottom 80 per cent firms in terms of product innovation management, process and work organisation. Means of responses were compared for two sets of companies. T-tests were performed to draw some conclusions on the results. Discriminant analysis was used to determine the factors distinguishing more and less innovative companies. The results showed SMEs in the manufacturing industry are similar to SMEs in other industries. The drivers of SMME innovativeness were: market anticipation, customer focus and commitment of CEO/owners in NPD, processes and new ways of working. Innovation was part of the business strategy and goal-oriented. However, innovation in SMME was based more around developing new ways of working than new product innovations. The use of systems/technology and process innovation was not uniform amongst more and less innovative companies. The main constraints of SMMEs were customer dependency, skills and knowledge acquisition

						through training, poor learning attitude and networking because of their tradition of being insular and autonomous. The paper provides useful information on innovation management in small manufacturing firms.
Ledwith, Richardson & Sheahan	Small firm-large firm experiences in managing NPD projects	*Journal of Small Business and Enterprise Development*	2006	*13*(3)	Electronic engineering Ireland Large enterprises Product development Small enterprises	The purpose of this research paper is to present a modified framework for the waves of change of new product development of McGrath. A qualitative study of new product development (NPD) in four electronic firms (two small indigenous/two large multinational) was conducted. In-depth interviews were held with employees, including the founding entrepreneur in each of the small firms. Analysis of strategic, organisational and development factors shows that firms face different challenges during their NPD process - some related to size. Also, as firms grow, NPD learning may be lost. The research findings are stated as a result of four cases studies - two in large firms and two in small firms. Further research will establish the generalisability of these findings. The electronics industry is renowned for its aggressive competitive environment where successful entrepreneurs continuously innovate product and process development. The framework presented will be of use to entrepreneurs who focus on NPD. A modified version of McGrath's framework, showing separate categories for small and large firms, is presented. These modifications recognise that there are differences between NPD in small and NPD in large firms.
Lee, J.	Discriminant analysis of technology adoption behaviour: A case of internet technologies in small businesses	*Journal of Computer Information Systems*	2004	*44*(4)	Small business Innovation adoption Information technology adoption Internet technology Internet adoption Technology acceptance Technology adoption Retail	The adoption of information technology represents a problem of magnitude to small business entrepreneurs. Comparing to larger corporations with abundant resources, small business owners are facing different challenges. Thus, the technology adoption behaviour seems to be different for them. This study reports on antecedent drivers of Internet technologies' adoption in small businesses. A behavioural model was developed based on prior research on innovation adoption in small businesses. The model posits relationships of the relative advantage of using IT, compatibility, ease of use, computer self-efficacy, financial slacks of the firm, innovativeness of the firm, image of IT, and competitive pressure against adoption of four different Internet technologies -- email, business homepage, e-sales and c-procurement. The results confirm the strong association of

						computer self-efficacy, compatibility, image, financial slack and relative advantage with Internet technology adoption. Different patterns of adoption behaviour across different technologies were revealed. Theoretical and practical implications are discussed.
Li & Mitchell	The Pace and Stability of Small Enterprise Innovation in Highly Dynamic Economies: A China-Based Template	*Journal of Small Business Management*	2009	*47*(3)	Small enterprise Innovation Knowledge spillover effects Transition economies Manufacturing sector China	In this paper, we analyze the dynamics of knowledge spillover entrepreneurship in the Chinese "transitional" context, as a template for the evaluation of the pace and stability of small business innovation institutionalization in many transition economies, and we also provide theory and evidence to further develop knowledge spillover entrepreneurship theory. Based on the first available cross-sectional data set (2005 for 2004) covering 158 manufacturing sectors over the five Chinese provinces representing one-third of China's industrial output, the empirical analysis provides evidence that local competition/specialization affect the pace/stability of innovation institutionalization in small enterprises and large-medium enterprises differentially, suggesting new insights for research and policy in the transition-economy/small business management context.
Li, Zhao, Tan, & Liu	Moderating Effects of Entrepreneurial Orientation on Market Orientation-Performance Linkage: Evidence from Chinese Small Firms	*Journal of Small Business Management*	2008	*46*(1)	Small businesses Strategic orientation Entrepreneurial orientation Market orientation Innovation Transition economies China	Literature revealed that an appropriate alignment between firm strategic orientation and market positioning is critical because of its impact on firm performance. The alignment is especially crucial for small businesses as a result of their limited resource base. However, studies have not adequately accounted for the joint effect of entrepreneurial orientation (EO) and market orientation (MO) on firm performance in different institutional environments, such as transitional economies. In this study, we examine the moderating effect of EO on the linkage between MO and firm performance among small enterprises in China. We have found that MO, alone and in conjunction with certain EO dimensions, is positively related to firm performance. More specifically, innovativeness and proactiveness have positively moderated the relationship between MO and performance. We discuss managerial implications and offer suggestions for future research.
Lin & Chen	Does innovation lead to performance? An empirical study of SMEs in Taiwan	*Management Research News*	2007	*30*(2)	Innovation Organizational performance Small-to medium-sized	This study attempts to probe within a multi-dimensional perspective the nature and type of daily innovation practices of small- and medium-sized enterprises (SMEs) located in Taiwan. The relationship between innovation and

					enterprises Taiwan	organizational performance will also be explored. Data of interest were collected through a telephone survey. From the 2000 Directory of Manufacturing and Service Industries in Northern Part of Taiwan, companies with a total employee number less than 200 (the definition of an SME in Taiwan) were the population. Telephone calls to 877 firms were successfully completed with a response rate of 87 per cent. Eighty per cent of the surveyed companies conducted some sort of innovation, the two major types of innovations were technological and marketing innovations. Innovation has a weak link with company sales. Administrative innovations have surfaced to be the most crucial factor in explaining sales rather than technological innovations. Creating a successful innovation platform to serve as a base for non-technology-related innovations may prove to be the most critical catalyst to capitalize on innovation efforts. The research results also provide some insights for companies that are not sure how to integrate innovation into their business operations. This study unveils the innovation practices of this novel economy and particularly focuses on the less explored SMEs in an Asian context.
Lindman, Scozzi & Otero-Neira	Low-tech, small- and medium-sized enterprises and the practice of new product development: An international comparison	*European Business Review*	2008	*20*(1)	Design Furniture industry Innovation New products Product development Small to medium-sized enterprises	The purpose of this study is to examine the new product management practices adopted by low-tech small and medium-sized enterprises (SMEs) in the context of design-intensive products. The results are based on a multi-case comparative setting covering SMEs in furniture industry in three countries, Italy, Spain and Finland. The study shows considerable differences in performance that occur in terms of the degree of design and innovation, goal orientation and the systematics by which a single furniture business is managed. Proactiveness and freedom in design and innovation together with systematic new product development (NPD) and goal orientation enhances NPD performance. As to the new product uniqueness, innovative design is applicable in furniture industry much as in a similar way as new technological knowledge is in technology industries. The management education and/or interests which are closely related to furniture design and decoration have a clear impact on the level up to which innovative designs are implemented. The study has direct implications for furniture companies

						aiming at improving their competitiveness and NPD effectiveness. The study points out the importance of creating a proper innovative culture and being open to new ideas if export markets are targeted. Technology intensive products in large- and medium-sized companies have been the main focus of NPD performance research, also facing the risk of over-generalization due to cross-industry approaches. Low-tech industries however play a major role as to national income and employment. In this respect the present study aims to highlight the prevailing NPD practices in small design-intensive firms in the furniture industry by reporting any management gaps which may occur in terms of new product performance.
Lipparini & Sobrero	The glue and the pieces: Entrepreneurship and innovation in small-firm networks	*Journal of Business Venturing*	1994	*9*(2)	SMEs Innovation Innovative performance Network structures Entrepreneurial capabilities Sustainable competitive advantage Italy	The entrepreneurial view of the firm stresses the need for a more insightful understanding of business leaders within sets of SMEs. Here, competitiveness emerges as a network-embedded capability and the coordination among firms, maximizing firm-specific competencies, represents a strategic leverage in accomplishing and maintaining a sustainable competitive advantage. When the goal is not only greater efficiency in terms of the lowest cost but innovation in terms of how to improve productive performance by changing the way in which it is undertaken, a critical issue becomes the entrepreneur's ability to create, manage, and recombine the set of relationships with external suppliers. The ability to glue external expertise and capabilities in an original and unique way is considered the key factor in pursuing innovative performance. As orchestrators of inter-firm linkages, entrepreneurs relying on personal networks and prior relationships are able to identify possible sources of knowledge. As coordinators of such innovative ties, they combine a wide set of diverse competencies not only to overcome size constraints through development cost reduction, but also to recoup ideas and creativity for the realization of more complex typologies of innovation. These elements reduce the level of uncertainty, while enhancing early cooperation between firms. Because the entrepreneur is supposed to be able to manage a higher number of "innovative poles", which can be better managed thanks to trust and reputation developed in prior relationships, the different

						management topology could be associated with a different level of supplier contribution to the development of new products. This paper provides insights into the role of suppliers in the new product development process, and explores the role of the entrepreneur in promoting and managing a wide set of external, innovative ties. Attention is focused on 103 small- and medium- sized firms located within two Italian industrial networks where interdependencies are unusually large and complex. With respect to the first aim, the empirical analysis confirmed SME's structural recourse to suppliers. More important, the contribution of such resources is not necessarily limited to cost reductions and marginal improvements. Although incremental contributions certainly exist and are relevant, more complex relationships largely focused on joint design and development emerge as important patterns in buyer--supplier interaction. With respect to the second aim, an entrepreneurial explanation of SMEs' innovative performance is advanced. In a competitive environment where the actors are not atomistic, but exist within systems of actors, the relational capability could represent for entrepreneurial firms the way to gain a sustainable competitive advantage. We found entrepreneurs who, exploiting basic experiences, seek new combinations among the various inter-firm ties, relying upon such linkages as a vehicle for transferring and combining their organizationally embedded learning capability. Our findings showed that (1) when the entrepreneur is leading and managing the business, more suppliers are involved in the development of new products, and (2) the type of contribution given by suppliers differs by management typology. More precisely, the incremental type of contribution is dominant whenever professional management is present, while the relevance of architectural and radical topologies increase when the entrepreneur is present. On a broader level, the findings suggest further studies to address the question of how internally determined, rather than spontaneous, is the evolution toward a network structure in sets of SMEs similar to those studied. We showed that the number and the quality of inter-firm relationships cannot be explained merely by environment-specific factors.

Macpherson, Jones, Zhang & Wilson	Re-conceptualising learning spaces: developing capabilities in a high-tech small firm	*Journal of Workplace Learning*	2003	*15*(6)	Innovation Learning Organizational development Small to medium-sized enterprises	Examines the process of managerial learning in a relatively remote rural small-sized firm. Relational competences and organisational innovation are key to the capture, employment and creation of knowledge and learning within the firm. The case study organisation has created a virtual cluster of innovation, through their supply network, that reaches well beyond the traditional regional institutional support mechanisms. Through this network of relationships, they have enhanced their own learning, facilitated the learning of supplier firms and integrated knowledge to create opportunities for product innovation and development. The paper concludes that these learning experiences indicate policy implications for the support of learning in small firms. To overcome failings in traditional support systems, policy should be directed at the development and maintenance of learning networks. This informal and organisational specific approach to learning and development overcomes some of the barriers to managerial learning in SMEs, and is a method that will address the specific business needs of small firms.
Major & Cordey-Hayes	Engaging the business support network to give SMEs the benefit of foresight	*Technovation*	2000	*20*(11)	Foresight SMEs Intermediaries Innovation Knowledge transfer	This paper reports on recent research aimed at improving interaction between the Foresight programme and SMEs (Small and Medium sized Enterprises). The UK Foresight programme is a major input into the ongoing debate into innovation and the science base in the United Kingdom. SMEs have so far failed in significant numbers to become involved in the forward thinking culture that Foresight promotes. This paper examines the problem of how Foresight can be packaged to make it more SME-friendly. This work used the context of knowledge transfer and the intermediary role of the business support community. Conceptual frameworks were developed to describe SMEs' managerial attitudes to the future and to give structure to the business support community. Fieldwork revealed patterns of interaction between SMEs and business support intermediaries. A model was developed showing a system for targeting Foresight to SMEs through the engagement of these intermediaries. This paper examines the implications of this model and locates the contributions of the research.
Maniukiewicz, Williams & Keogh	Partnerships and networks: lessons from facilitating	*Journal of Small Business and*	1999	*6*(1)	Entrepreneurialism Local government	The delivery of assistance to SMEs, provided by enterprise councils at the local level, can vary between those bodies

	entrepreneurship	*Enterprise Development*			services Networking Partnering Start-ups Universities	which are innovative and those which are pedestrian in their approach. Although it is generally accepted that most small firms in the UK sell to local markets, SMEs based within the Aberdeen area of Scotland play an important role in exporting and employment. The potential for birth and growth of firms exists in a number of targeted key sectors which aid the economic development of the Aberdeen area. However, assistance is required to bring people together in order to encourage networking, and this paper seeks to explore the process of facilitating an enterprise culture by examining the collaboration and partnership roles played by a LEC and a university in initiatives which foster enterprise. The relationship of the researchers and practitioners is similar to the model outlined by Oakey and Mukhtar where research and practice are used to inform each other, over time, to identify policy needs. The initiatives examined in this paper are the Entrepreneurs Club where established entrepreneurs mix with others at the new venture stage, and the Chrysalis Elite programme which links graduates with existing owner managers, creating a work-based project involving groups of students. These links extend to the wider business community and organisations, including local entrepreneurs (who provide prizes and guidance), 3i and the Local Investors Network Company (LINC), who offer advice and opportunities. The main outcomes for policy in this paper are that collaboration between a LEC and a university can be very effective in assisting individuals or groups to meet the challenge of building entrepreneurial networks and that effective support can be provided for students to gain experience from the business community.
Mankelow, G.	Social responsibility paradox of small business human resource management practices	*International Journal of Human Resource Management*	2008	*19* (12)	Small business Social responsibility HR management HR motivations Australia	This article investigates social responsibility (SR) and human resources management practices focused on internal stakeholders, namely employees, in a context of small business. SR is defined as 'obligations to constituent groups in society other than stockholders and beyond that prescribed by law and union contract' Jones (1980, pp. 59-60). Numerous studies have addressed the economic significance and effects of small business but contributions to HR within small businesses have remained relatively unexplored in contemporary SR literature. A case research methodology

						employing theoretical replication was used to select 10 small businesses across industry sectors. These were chosen with the assistance of the Hunter Business Chamber, Australia. A semi-structured face-to-face interview with the owner of the business who also functioned as the manager was undertaken using a research instrument comprising eight qualitative and open-ended questions. The questions specifically addressed the small business owner's HR priorities, motivations, and financial contribution to SR. This research is designed to fill a gap that exists in the literature and can be considered innovative and timely given the growing interest by society in SR. The principal objective of this research is to broaden the understanding of small business by addressing the research problem: 'Are human resource management practices of small businesses socially responsibility or market driven?'.
Martin, L. M.	E-innovation: Internet impacts on small UK hospitality firms	*International Journal of Contemporary Hospitality Management*	2004	*16*(2)	Entrepreneurialism Hospitality services Innovation Internet Small enterprises United Kingdom	Within the small firms sector, the Web is anticipated to bring unprecedented new opportunities for business development and competitive advantage. The reality in small firms, however, may be that lack of understanding of the value the Net may provide in the context of their own organisation, deters many owners from gaining such advantages. This paper looks at six cases of small hospitality firms. "E-innovation" here represents innovative strategy enabling customers to do what best serves their purpose via information communications technology. These small hospitality firms have adopted the Web and used it; as a result they have changed business processes and personal expectations. Suggests that the current narrow focus on business growth or on technology alone seen in current initiatives may miss owners such as these who took up the Net for social and personal reasons but developed business uses alongside them. Recommends that an integrated hosting of such firms would provide better customer access, and therefore lead to benefits for such firms. Where targets are set for increases in tourism, it is also recommended that the Internet might play a part in developing such growth, if integrated and applied to the context of hospitality firms.
Martin & Matlay	Innovative use of the Internet in established small firms: the impact of knowledge	*Qualitative Market Research: An International Journal*	2003	*6*(1)	Innovation Internet Knowledge	In this article, three established small- and medium-sized enterprises provide qualitative case study evidence of the extent to which information communications technology can

	management and organisational learning in accessing new opportunities				management Organizational learning Small- to medium-sized enterprises	be embedded within a firm's marketing strategy, from the earliest adoption stages to the integration of the Internet with key business functions. These case studies also provide insights into the innovative ways that can be used to reposition a firm, its marketing strategy, services and products, both within the national and the global marketplace. Established firms, in addition to new businesses and industries, could gain considerable competitive advantage from Internet usage, if they can achieve the right mix of managerial capacity and marketing focus in terms of image, brand and customer needs. Their human resource base could allow such firms to "reinvent" themselves, mainly by effectively accessing and embedding new knowledge. It emerged that organisational culture facilitates and supports the wider access and application of new knowledge through organisational learning mechanisms.
Martin & Wright	No gender in cyberspace?: Empowering entrepreneurship and innovation in female-run ICT small firms	*International Journal of Entrepreneurial Behaviour & Research*	2005	*11*(2)	Communication technologies Empowerment Entrepreneurialism Sex and gender issues Small enterprises Women	To explore how information communication technologies (ICT) and the internet offer new opportunities for women to develop as entrepreneurs and innovators. To add to the literature and provide updated research to raise awareness about female-run ICT small businesses. Uses qualitative research methodology for case studies of female entrepreneurs and thematic grid analysis to form a major part of text analysis. The approach is influenced by the need to examine closely the nature of the enterprises or phenomena under investigation and to ask pertinent questions related to their particular mode of operations. Shows the background of small firm development and innovation as well as personal and company characteristics, personal contacts and IT networking in obtaining information and customers. Reflects also the concern of female entrepreneurs from ethnic minorities in gaining financial backing and recognition of themselves as committed and successful entrepreneurs. The main limitation is the small size of the sample (ten firms). There are implications for further work on gender analysis. The sample, though small, has contributed insights into the challenges facing women entrepreneurs in business and questioned the constraints on ethnicity for others. Technology is a great equaliser and the research has added further discussion on the economic contribution of female entrepreneurs. Shows

						guidance on qualitative analysis using personal interviews and thematic grid analysis of textual data, as well as presenting findings. Contributes to the literature due to the scarcity of publications concerning female-operated ICT small businesses. The paper is useful for researchers wishing to pursue entrepreneurship and gender studies.
Massoud, S.	Digital technology model that links African American small businesses with innovation	*Academy of Information and Management Sciences* (Allied Academies International Conference Proceedings)	2002	*6*(2)	African Americans Models Small business Electronic commerce Innovations Studies	Expansion of electronic commerce has the potential to increase retail productivity. However, during the past few year s numerous e-commerce in the business-to-consumer (B2C) market, but has not been as successful and rapid as expected. Today, with an economy enable and driven by connectivity, a fundamental shift in business models is occurring whereby information, knowledge and relationships underline competitive advantage. In order to complete in what is referred to as New Economy, companies must use technology-mediated channels, formulate technology convergent strategies, and organize resources around knowledge and relationships. This study introduces a conceptual model that maps access to knowledge flows against limitations such as the size of the company or the lack of technology knowledge. It is suggested that fostering a culture of connectivity to initiate knowledge exchange may offer a potential solution to the possible loss of competitive advantage for small businesses in the digital economy.
McAdam, Armstrong & Kelly	Investigation of the relationship between total quality and innovation: a research study involving small organisations	*European Journal of Innovation Management*	1998	*1*(3)	Corporate culture Implementation Innovation Small firms TQM	Investigates how organisations can progress from total quality (TQ) to business innovation and represents the first part of an EU sponsored research programme in total quality and innovation. First, definitions and underlying assumptions are analysed which enables a definition of TQ and innovation to be derived that can accommodate a natural organisational progression in terms of implementation. Second, TQ and Innovation are compared and contrasted by analysing models in each of the respective fields. The main findings were that, in general, innovation models were based more on organisational learning and appreciation of human capital than TQ models, which were based more on mechanistic process based continuous improvement. Finally, the results of a research study into innovation and total quality are presented and discussed. The study found that organisations which have a history of continuous improvement are more likely to go on

						and build a successful innovative culture.
McAdam, Stevenson & Armstrong	Innovative change management in SMEs: beyond continuous improvement	*Logistics Information Management*	2000	*13*(3)	Innovation Kaizen Organizational change Small- to-medium-sized enterprises	With increasing market pressure and fragmentation Small to Medium Sized Enterprises (SMEs) must move beyond the change philosophy of Continuous Improvement (CI) and develop a culture of innovation. To find out if SMEs could go beyond CI to achieve effective business innovation as a change management philosophy, a literature survey and a research survey on 15 SMEs was conducted to provide additional relevant information. The main research findings were: the SMEs exhibited a range of Continuous Improvement and innovation characteristics - some had adopted a culture of Continuous Improvement, while others had not; the SMEs which had adopted a culture of Continuous Improvement found that it could provide a solid foundation on which to build a culture of effective business innovation; and these SMEs were found to have embraced all the different components of innovation, as measured, more readily than those SMEs which did not have a culture of Continuous Improvement.
McCann, Leon-Guerrero & Haley	Strategic Goals and Practices of Innovative Family Businesses	*Journal of Small Business Management*	2001	*39*(1)	Small firms Family business Strategic orientation Performance factors Business practices	A profile of 231 Washington state family businesses is presented. This article focuses on the business strategies of these firms, analyzing the relationship between strategy, performance, and business practices. Firms categorized as Prospector firms reported more gains in their current market position than all other strategic types. These firms were more likely to value an effective management and employee team and to develop new quality products and services and career development plans for non-family employees. Implications for family businesses are discussed.
McElwee & Atherton	Publication trends and patterns in entrepreneurship: The case of The International Journal of Entrepreneurship and Innovation	*Journal of Small Business and Enterprise Development*	2005	*12*(1)	Entrepreneurialism Publishing Research	This paper considers the models, methodologies, techniques and data utilised in articles published in "The International Journal of Entrepreneurship and Innovation" over the period 1999-2003, in an attempt to determine theoretical and methodological trends and themes emerging from within the literature. The paper considers articles published in the journal from multiple perspectives including: methods of data analysis, epistemological frameworks deployed, dominant academic disciplines and geographical location of the authors. Topic areas and keywords associated with each article are examined in order to identify particular foci for publication

						and to broadly determine the "topography" of published output. The broad publication profile was of more quantitative than qualitative papers, with some consideration of policy issues. Analysis is confined to an example of one journal in the field and thus its comparative validity is limited. A very useful account of publication trends in the discipline. The article is of value to academics who are seeking to publish. Indicates the methodological trends that are utilised in the discipline. This is an innovative investigation into publication trends in the discipline.
Mets, T.	Creating a knowledge transfer environment: The case of Estonian biotechnology	*Management Research News*	2006	*29* (12)	Biotechnology Estonia Innovation Knowledge transfer Research and development	To evaluate the science and technology (S&T) development framework within Estonia, a small transition country, and its biotechnology sector. In the general overview the main concepts, actors and environment of S&T system in the triple helix context are analyzed. The empirical study explores the general research and development (R&D) environment of Estonia and particularly the biotechnology sector by mapping the actors, strategy of companies (all small and medium-sized enterprises - SMEs), innovation processes and related expenditures of the public sector and private businesses. The study results indicate the ratio of basic and applied research, and product/service development in the gross R&D funding structure in Estonia to be 3:3:4; in the biotechnology sector this ratio is 11:5:1. The structure of research expenditure in the public sector mostly reflects the success of Estonian biosciences rather than the success of biotech as a business sector. Ways for improving S&T system are suggested. Mapping the actors, and measurement of the structure of the R&D expenses in the Estonian biotech sector and in SMEs in particular.
Michael & Pearce	The need for innovation as a rationale for government involvement in entrepreneurship	*Entrepreneurship and Regional Development*	2009	*21*(3)	Government policy Small business Entrepreneurship Regulation	Governments around the world seek to support entrepreneurship, yet the justification for such intervention varies. Some governments support entrepreneurship as a means to create jobs. Others support entrepreneurship as a means to create competition in markets, with attendant lower prices. In this paper, we offer a different justification for government support for entrepreneurship: to support and encourage innovation. Innovation does raise competition, lower prices, and create jobs, but more importantly through innovation entrepreneurship creates wealth for individuals and

						nations. We offer a model of government support for entrepreneurship to yield innovation that is grounded in theory yet rich in practical implications. Innovation is stimulated when the innovator receives the resulting payoff (termed residual claims in economic theory). In many instances, because small firms concentrate residual claims more effectively than large firms, entrepreneurial firms out-innovate established corporations. To accelerate this process, government should advance policies that facilitate new business formation and the concentration of residual claims. Such a prescription suggests two direct approaches: raising the returns to entrepreneurship and reducing the risk. Each has specific policy implications that are discussed at length. Finally we analyse aiding entrepreneurship without a commitment to innovation, and our analysis suggests that this approach is unlikely to be as successful as the focus on innovation.
Mitev & March	Small businesses and information technology: risk, planning and change	*Journal of Small Business and Enterprise Development*	1998	*5*(3)	Information technology strategy Managerial power Small- to medium-sized enterprises	Some of the factors contributing to the risks SMEs take when implementing information technology were investigated in a questionnaire survey of 18 small businesses in the Greater Manchester area, complemented by interviews with the advisers working at the Greater Manchester Business Innovation Centre. New technology can seem a threat to small business owner-managers and there is a link between business growth and the use of IT. There has been increased adoption of all categories of software, from databases, CAD-CAM and presentation packages, to spreadsheets and communications software, but respondents expressed dissatisfaction with software, more than with hardware. There is a perceived lack of expertise in the planning process as well as the technology itself. Responses were split over loss of managerial control: SME owner-managers want to remain in control, IT may be associated with growth, and some may resist growth. A strong need for impartial advice, independent from computer vendors, has been expressed, and a worrying number of respondents did not consider maintenance and training costs when purchasing technology. Organisational factors such as staff skill levels, familiarisation time, and the impact on jobs, were rarely considered prior to purchase. Opinions on training provision were divided. More complex IT-related business

						and organisational changes may require integrated technical and managerial training, so that SMEs can become more strategically oriented and benefit better from IT.
Mosey, S.	Understanding new-to-market product development in SMEs	*International Journal of Operations & Production Management*	2005	*25*(2)	Innovation New products Small to medium-sized enterprises	This study aims to understand how small- to medium-sized enterprises (SMEs) can build a dynamic capability for new-to-market product development. Five innovative and ambitious case firms were selected and studied longitudinally over the course of five years. Within this group distinct development processes are identified that enable them to satisfy the unmet needs of new customers using their current technologies. However to sustain this activity managers need to empower cross-functional teams to evaluate new technologies with an ever-increasing number of pioneering partners. An ideal sequence is proposed for them to achieve this by systematising learning between projects and thereby reconfiguring their development processes to meet the changing needs of the market. This method appears most suited to SMEs able to develop new-to-market products in conjunction with technologically discerning customers and suppliers. As such it may be less applicable outside the observed business-to-business markets. The five cases studied aptly illustrate the interplay of certain paths, positions and processes in terms of how they relate to new-to-market product development performance. The implication for researchers and managers is that consideration of all of these factors is necessary.
Namiki, N.	Export Strategy for Small Business	*Journal of Small Business Management*	1988	*26*(2)	Variance analysis Target markets Studies Small business Product development Market strategy Innovations Exporters Differentiation Strategic planning International trade Entrepreneurs	Exporting as a means of corporate growth is particularly appropriate for manufacturers of industrial goods or products with innovative advantages and for smaller firms without the resources for more extensive international operations. A strategic group analysis was conducted of small firms competing in export markets and included a questionnaire that was sent to 393 firms in the US computer hardware manufacturing field with experience in exporting. The results identified 4 patterns of competitive strategies used by small-sized firms in export markets. These patterns include: 1. competing through market differentiation, 2. a differentiation focus strategy, 3. pursuing innovative differentiation through technological superiority of products and new product development, and 4. a product-oriented strategy. Exporters

						using differentiation focus strategies and innovative differentiation strategies were found to achieve higher export performance than those using a marketing differentiation strategy.
Oakey & Cooper	The relationship between product technology and innovation performance in high technology small firms	*Technovation*	1991	*11*(2)	Small firms Biotechnology High technology Growth rates Policy development	This paper considers the relationship between product technology and the innovation and growth process in high technology small firms. With evidence from the biotechnology and the scientific instruments and electronics industries it is suggested that significant theoretical and practical differences may exist between industries that are generally termed 'high technology'. Politicians and government planners eager to exploit the opportunities offered by emergent key technologies have almost reached a point where it is assumed that the encouragement of any new technology will result in rapid and sustained industrial growth. It is suggested, however, that the basic technologies of high technology industries significantly influence the ability of small firm entrepreneurs to found and expand new businesses, and therefore that variable strategies and rates of development between sectors will be observed. The paper concludes with a discussion of policy formulation which stresses that, while policies aimed at the encouragement of high technology small firm growth are warranted, they should be based on the acceptance that short-term growth rates will vary owing to sharply differing production technologies that might appear superficially similar. This implies that firms may have different requirements in terms of assistance from external agencies, and that a policy which treats all high technology firms as similar may be flawed.
O'Dwyer, Gilmore & Carson	Innovative marketing in SMEs	*European Journal of Marketing*	2009	*43* (1/2)	Marketing Small to medium-sized enterprises	The purpose of this paper was to investigate the concept of innovative marketing and how it manifests itself in the context of small-to medium-sized enterprises. The literature relating to the characteristics of SMEs, and innovative marketing are reviewed to identify the key elements of innovative marketing and SMEs. This review and the key elements identified contribute to an overall conceptualisation of innovative marketing for SMEs. The discussion considers and provides a description of innovative marketing in SMEs. Innovative marketing does not just relate to products, new product development, and technological development but is also

						evident in other aspects of marketing related activities and decisions and is very specific to the context and needs of the SME. The focus of this paper is on taking the relevant themes from the literature and considering them in the light of SME marketing and in the context of SME business activities.
Olson, P. D.	Entrepreneurship and Management	*Journal of Small Business Management*	1987	*25*(3)	Success Startups Small business Skills Organizational structure Management Factors Entrepreneurs Development stage enterprises Corporate growth	During the start-up phase of an entrepreneurial small business, desirable traits for key personnel include: 1. role orientation, 2. a high tolerance for ambiguous, unstructured situations, 3. an ability to take the long view, 4. acceptance of moderate risk, 5. both intuitive and analytical abilities, and 6. a high need for achievement. During the start-up phase, the entrepreneurial firm should have few divisions. Other factors that can increase its chances for success include: 1. employees who are generalists, 2. a flexible informal control system, 3. a close, unstructured communication network, and 4. location of the final decision authority with the entrepreneur. During the firm's growth phase, the focus shifts from conceptual development to the creation of organizational systems and processes that facilitate more efficient use of innovative ideas. Design changes during this phase will include: 1. the creation of various functional departments and managers, 2. the establishment of work routines requiring specialized skills, 3. the development of hierarchical decision mechanisms, and 4. the installation of quasi-formal control rules.
Otero-Neira, Lindman & Fernandez	Innovation and performance in SME furniture industries: An international comparative case study	*Marketing Intelligence & Planning*	2009	*27*(2)	Business performance Furniture industry Innovation Small to medium-sized enterprises	Innovation has been traditionally considered as a generator of competitiveness, which leads to superior performance. Considering that innovation is a complex phenomenon, it is interesting to understand how innovations are linked with organisations' performance. In this sense, the purpose of this paper is to understand the conditions that make innovation profitable. The methodology used in the analysis is a multi-case comparative research of low-tech, small and medium-sized furniture firms from Italy, Spain and Finland. The study shows some evidence that innovation positively influences business performance. In particular, the results suggest that different performance levels are linked to the type of innovation developed. The study presents direct implications for companies aiming at improving their innovation effectiveness. First, it is recommended that firms consider the environment in which they operate; second, they should

						coordinate future innovation plans by considering the synergistic process among the product, market and process innovations to arrive at a combination that will yield optimal levels of performance. Additionally, the study points out the crucial role that the management style plays in developing innovation capabilities. The paper offers an insight to explain why some companies are more successful at starting and developing innovation than others. The finding that a successful innovation profile is related to the performance of the company represents an interesting contribution to the management of firms.
Özgener & Iraz	Customer relationship management in small-medium enterprises: The case of Turkish tourism industry	*Tourism Management*	2006	*27*(6)	Customer relationship management (CRM) SMEs Tourism sector Factor analysis	In this study, the factors influencing the implementation of customer relationship management (CRM) at small and medium-sized tourism enterprises in Cappadocia were analyzed. The findings of the research indicate that communication-distribution infrastructure, business dynamics, customer relations and innovation-quality factors affect CRM. Business dynamics plays an especially critical role in customer relations. It was also determined that the most important barriers to small and medium-sized enterprises (SMEs) in the tourism sector are inadequate supporting budgets, lack of senior management commitment to CRM and poor communication.
Pavia, T. M.	Product growth strategies in young high-technology firms	*Journal of Product Innovation Management*	1990	*7*(4)	Small firms High technology Manufacturing Systematic strategic planning Technological innovative	This article presents an analysis of the strategies, business practices and growth patterns of 68 small, young, high-technology firms. These firms manufactured high-technology goods or produced advanced computer software products, had at most 100 employees and reported under $30 million in annual sales. In reporting the results of her study, Teresa Pavia writes that neither a technological growth path (new products to existing customers) nor a market-expansion growth path (existing products to new customers) is superior. Practices that minimize strategic dependencies and produce a high-quality product that suits the customer's needs directly (needing no further modifications after the sale) are associated with success. Firms that have used market expansion to grow demonstrate higher levels of systematic planning and describe their industry as rapidly changing. Furthermore, they describe themselves as technologically innovative and their customers as well informed about the products they buy.

Peltier, Schibrowsky & Zhao	Understanding the Antecedents to the Adoption of CRM Technology by Small Retailers Entrepreneurs vs Owner-managers	*International Small Business Journal*	2009	*27*(3)	Small business Customer relationship management Diffusion of innovation Environmental complexity Relative advantage CRM adoption Entrepreneurship Retail Risk orientation	Customer relationship management (CRM) technology provides a strategic opportunity to better understand customers. Virtually unexplored is research targeting CRM adoption by small businesses. This exploratory study investigates the factors that influence the adoption of CRM technology by small entrepreneurial retail firms. A key premise is that 'entrepreneurial' retail store owners can be differentiated from 'owner-managers' through their adoption of CRM. A preliminary model is developed and tested through a sample of 386 small hardware retailers responding to a mail questionnaire. The findings show that CRM adopters had higher product class knowledge, a greater risk orientation, saw a stronger relative advantage, perceived higher environmental complexity and hostility, and had a more open business change orientation.
Perry& Wildman	Training the Unemployed for Entrepreneurship: Blending Personal and Business Development in Australia	*Journal of European Industrial Training*	1989	*13*(1)	Australia Business development Entrepreneurship Small firms Training	It is argued that most Australian training courses for unemployed people starting their own small business emphasise business development. An innovative course in the State of Queensland blends personal and business development together, using experiential techniques. Feedback during the course and several months afterwards suggest the course successfully achieves its objectives.
Pflughoeft, Ramamurthy, Soofi, Yasai-Ardekani & Zahedi	Multiple conceptualizations of small business web use and benefit	*Decision Sciences*	2003	*34*(3)	Small business E-commerce infusion Internet and Web Multivariate statistics Parameter estimation Structural equation models	Small businesses play an important role in the U.S. economy and there is anecdotal evidence that use of the Web is beneficial to such businesses. There is, however, little systematic analysis of the conditions that lead to successful use of and thereby benefits from the Web for small businesses. Based on the innovation adoption, organizations, and information systems (IS) implementation literature, we identify a set of variables that are related to adoption, use, and benefits of information technology (IT), with particular emphasis on small businesses. These variables are reflective of an organization's contextual characteristics, its IT infrastructure, Web use, and Web benefits. Since the extant research does not suggest a single theoretical model for Web use and benefits in the context of small businesses, we adopt a modelling approach and explore the relationships between "context-IT-use-benefit" (CIUB) through three models-partial-mediator, reduced partial-mediator and mediator. These models posit that the extent of Web use by small businesses

						and the associated benefits are driven by organizations' contextual characteristics and their IT infrastructure. They differ in the endogeneity/exogeneity of the extent of IT sophistication, and in the direct/mediated effects of organizational context. We examine whether the relationships between variables identified in the literature hold within the context of these models using two samples of small businesses with national coverage, including various sizes, and representing several industry sectors. The results show that the evidence for patterns of relationships is similar across the two independent samples for two of these models. We highlight the relationships within the reduced partial-mediator and mediator models for which conclusive evidence are given by both samples. Implications for small business managers and providers of Web-based technologies are discussed.
Prajogo, D. I.	The relationship between innovation and business performance - a comparative study between manufacturing and service firms	*Knowledge and Process Management*	2006	*13*(3)	Innovation Business performance Manufacturing Services Competitive advantage Structural equation modelling Australia	This paper explores the relationship between innovation performance (in terms of product and process) and business performance (sales growth, market share and profitability) and compares this relationship between manufacturing and service firms. This study was driven by the lack of studies on innovation in service sectors despite the importance of innovation as one of the primary sources of competitive advantage. Furthermore, as manufacturing firms and service firms are different in many respects, including innovation performance, it could be expected that manufacturing firms could pursue and emphasise different aspects of innovation than their service counterparts. Empirical data was gathered from 194 managers in Australian firms, with nearly equal proportion drawn from the manufacturing and service sectors (52% and 47% respectively). Several major findings were found through data analysis. First, there was no significant difference between manufacturing and service firms in both product and process innovation performance. The second finding, however, indicated a stronger correlation existed for manufacturing firms than for service firms between innovation and business performance, particularly in relation to process innovation. Third, it was found that process innovation shows a relatively stronger relationship with business performance than product innovation in manufacturing sectors.

Pretorius, Millard & Kruger	The relationship between implementation, creativity and innovation in small business ventures	*Management Dynamics*	2006	*15*(1)	Studies Entrepreneurs Creativity Small business Innovations Perceptions	This exploratory study investigated venture managers' creativity, the innovativeness of their ventures, and their implementation orientation. The study is important in view of South Africa's poor global ranking in "Total Entrepreneurship Activity" (TEA), reported by the Global Entrepreneurship Monitor. Creativity is closely related to entrepreneurial activity as an entrepreneurial skill, and therefore the levels of and relationships between creativity, innovation and implementation need to be assessed to create a basis for investigation and to explore possible reasons for the low entrepreneurial activity in South Africa. The literature on entrepreneurship theory concerning creativity, innovation, implementation and the entrepreneurial process is combined into a conceptual model and precedes the results of a survey among small-venture managers. Firstly, the analysis confirmed the existence of perceptions of own creativity, perceptions of venture innovativeness and implementation orientation of small-venture managers as measurable factors. Secondly, it was found that venture managers do perceive themselves as creative and their ventures as innovative but, contrary to expectations, it was found that implementation orientation was lacking. Thirdly, the absence of expected correlations between creativity, innovation and implementation raised several interesting challenges for creativity development and education in the entrepreneurship domain.
Quaddus & Hofmeyer	An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses	*European Journal of Information Systems*	2007	*16*(3)	B2B trading exchanges Small business Adoption/diffusion Partial least square Australia	Small businesses, in general, play dominant roles in terms of employment generation and share in total business activities. However, studies have shown that small businesses are also slow in their uptake of modern technologies including electronic commerce. This paper presents the result of an empirical study that investigates the adoption behaviour of small businesses in relation to business-to-business (B2B) trading exchanges in the context of Western Australia. Following extensive literature review on innovation adoption diffusion theories and qualitative field study, a research model was developed which treated six sets of antecedents of small business's attitude towards B2B trading exchanges. The findings revealed that external influences raise the small business's awareness of an innovation. This awareness leads to

						the evaluation of the perceived direct and indirect benefits and a positive evaluation leads to a positive attitude towards the innovation. The results confirmed that a positive attitude towards B2B trading exchanges leads to the intention to adopt B2B trading exchanges in small businesses. The findings also confirm that external, belief, contextual and control factors drive the attitude towards B2B trading exchanges. Implications of the results are highlighted.
Radas & Bozic	The antecedents of SME innovativeness in an emerging transition economy	*Technovation*	2009	*29* (6/7)	SME Innovation Developing country	Understanding forces that contribute to the success of small and medium enterprises (SMEs) is very important, as these enterprises are vital for both developed and developing economies. Since innovativeness is among the most important means through which such businesses contribute to economic growth, numerous research studies were conducted to determine which factors positively impact SME's innovative efforts. This is an even more important issue for developing economies, where SMEs are often faced with inadequate infrastructure. Since there is a lack of studies on SME innovation in developing economies, often policy in such countries is based on findings from developed countries. In this paper, we explore factors that drive innovation activities in SMEs in a small emerging transition economy (Croatia), and compare it with findings from developed economies. In addition to factors used in most previous studies, we consider market scope, firm's market orientation and presence of strategic, managerial and marketing changes. We find that most factors that were found to be important in developed economies are important in developing economies as well. In addition to that, market scope was discovered to be a very important factor in both product and process innovation. Implementing corporate changes has positive impact on radical product innovation while implementing new organizational structures has positive effect on incremental innovation. When investigating determinants of product innovation, we distinguish new products of low novelty from new products of high novelty, and show that they need to be supported by different policies. To gain additional insight in innovation efforts, we examine obstacles to innovation. We find that firms that report facing obstacles are not less likely to innovate less, which suggests that innovators are able to work

						around obstacles without damaging effects to innovation. This study is based on a postal survey of 448 SMEs in Croatia, which was performed in 2004.
Radzeviciene, D.	Developing small and medium enterprises using knowledge management frameworks: A case study in Lithuania	*Aslib Proceedings: New Information Perspectives*	2008	60(6)	Information management Knowledge management Lithuania Small to medium-sized enterprises	The purpose of this paper is to analyse the role of knowledge management (KM) in small and medium-sized enterprises (SMEs) in Lithuania by looking at information and knowledge resources, the development of information technology (IT) which supports the business process and the main processes of KM inside companies. Questionnaires and some interviews within Lithuanian SMEs helped reveal what the present situation is in terms of KM processes and the use of IT. There appears to be a strong awareness of KM already. However, the development of adequate methods to make information management (IM) and KM fully effective appears to be lacking or only partially realized. There is some evidence to suggest that Lithuanian SME managers are becoming more psychologically prepared to work within KM but there is much less evidence to show that this is leading to effective innovation in practice at present. There is great interest in the smaller emergent European economies in particular, and in SMEs in general. Lithuania inherited a stronger asset base than some ex-Soviet republics and is positioning itself amongst the Baltic economies. With few natural resources, "knowledge" is a key area for growth, but SMEs and other sectors still need to engage strongly in development. SMEs have yet to drive the economy forward.
Rae, D.	Practical theories from entrepreneurs' stories: discursive approaches to entrepreneurial learning	*Journal of Small Business and Enterprise Development*	2004	*11*(2)	Entrepreneurialism Learning Narratives	This study develops the use of "practical theory", as a resource in entrepreneurial learning. Practical theory emerges from the implicit, intuitive, tacit and situated resource of practice, whereas academic theory is abstract, generalised, explicit and seeks to be provable. The study develops practical theories from the life story accounts provided by interviewing entrepreneurs. The study demonstrates a framework and example for interpreting entrepreneurial learning and developing practical theory from these accounts. Thirty practising entrepreneurs were interviewed, in a wide range of industries and at different stages of life and career experience, from first venture to experienced serial entrepreneur. Practical theories of entrepreneurial working have been developed, using the framework of "what, how, why, who and in what

						conditions" the practices identified are effective. The practical theories arising from the study are presented using this structured framework, based on a sense making perspective. Discourse material is used to support and illustrate the practical theories, which relate to personal learning and development; identifying and developing innovative opportunities; creating new ventures; and managing growing businesses.
Ramdani, Kawalek & Lorenzo	Predicting SMEs' adoption of enterprise systems	*Journal of Enterprise Information Management*	2009	*22* (1/2)	Information systems Innovation Small to medium-sized enterprises	The purpose of this paper is to develop a model that can be used to predict which small to medium-sized enterprises (SMEs) are more likely to become adopters of enterprise systems (ERP, CRM, SCM and e-procurement). Direct interviews were used to collect data from a random sample of SMEs located in the Northwest of England. Using logistic regression, 102 responses were analysed. The results reveal that the factors influencing SMEs' adoption of enterprise systems are different from the factors influencing SMEs' adoption of other previously studied information systems (IS) innovations. SMEs were found to be more influenced by technological and organisational factors than environmental factors. Moreover, the results indicate that firms with a greater perceived relative advantage, a greater ability to experiment with these systems before adoption, greater top management support, greater organisational readiness and a larger size are predicted to become adopters of enterprise systems. Although this study focused on the factors that influence SMEs' adoption of a set of enterprise systems (i.e. ERP, CRM, SCM and e-procurement), it fails to differentiate between factors that influence each of these systems. The model can be used to assist software vendors not only to develop marketing strategies that can target potential adopters, but also to develop strategies to increase the adoption of ES among SMEs. The paper contributes to the continuing research in IS innovations adoption/diffusion in the small business context.
Raymond & Bergeron	Enabling the business strategy of SMEs through e-business capabilities: A strategic alignment perspective	*Industrial Management & Data Systems*	2008	*108* (5)	Business performance Canada Electronic commerce Small to medium-sized enterprises	The present study aims at a deeper understanding of the performance outcomes of the alignment between the e-business capabilities of manufacturing small- and medium-sized enterprises (SMEs) and their business strategy in terms of Miles and Snow's recognised strategic typology that includes prospectors, analyzers, and defenders. From a

						contingency theory perspective, a survey of 107 Canadian manufacturers was used to collect data that were analyzed through correlation analysis. Results indicate that the ideal e-business profiles vary in the relation to the firms' strategic orientation, whether it is of the defender, analyzer or prospector type. E-business alignment has positive performance outcomes for manufacturing SMEs in terms of growth, productivity and financial performance. The nature of the sample impose care in generalizing the results of the study. These results also allow us to emphasise the nature rather than the investment value of the SMEs' information technology investment, given that certain forms of e-business would be more appropriate for certain firms, depending upon their strategic orientation. For SME owner-managers that require greater manufacturing flexibility, increased systems integration, products and services of better quality, and higher levels of product and process innovation, the results of this study allow us to prone an examination of their firm's level of e-business assimilation, this being done in conjunction with their strategic intent. This is one of the first studies to have used a rigorous conceptualisation and measure of alignment to confirm the theoretical validity and empirical usefulness of this notion and of the strategic contingency approach for research on e-business, and to compare this approach with the universalistic approach founded upon “best practices”.
Redoli, Mompó,García-Díez & López-Coronado	A model for the assessment and development of Internet-based information and communication services in small and medium enterprises	*Technovation*	2008	*28*(7)	Information and communication technologies (ICT) Small and medium enterprises (SME) Entrepreneur Market research Innovation Telecommunications Information systems	Young engineers understand technology very well, but they usually have poor skills on business practices. For this reason, they should appreciate tools that help in assessing small companies from a combined viewpoint of business and technology. In this article we present such a tool in the form of a model that helps to understand how an enterprise is using information and communication technologies (ICTs) and "how" and "when" a company should incorporate new technological elements. The model can also be applied to marketing research to understand the small and medium enterprises (SMEs) emergent market related to ICTs and to plan government policies devoted to fostering ICT introduction in SMEs. The model has been applied successfully in the assessment of 500 SMEs, and also as an innovative active learning tool for higher education.

Reynolds, L.	Small-Business Grants Spur Innovation	*Management Review*	1988	*77* (11)	Small business R&D Innovations High technology Grants Commercialization	Massachusetts-based Candela Laser Corp., a manufacturer of medical lasers, has experienced rapid growth since 1983 to a projected sales level of $100 million by 1991. Candela's success is attributed largely to the support of the Small Business Innovation & Research (SBIR) program, a federal project that facilitates the commercialization of innovative, smaller high-technology firms. Roland Tibbets of the National Science Foundation suggests that up to 60% of economic growth is attributed to technological innovations. SBIR has eliminated previous discrimination against small firms competing for research grants. Although the SBIR has been extended until 1990, new federal spending will not be a result. Companies seek SBIR's assistance through a 3-phase process that begins with a proposal and statement of merit. Scientist Gerald Ross describes how an SBIR grant from the Defense Nuclear Agency benefited both parties as the government received an effective radar system.
Riemenschneider & McKinney	Assessing belief differences in small business adopters and non-adopters of web-based e-commerce	*Journal of Computer Information Systems*	2001	*42*(2)	Small business Theory of planned behaviour E-commerce Adopter beliefs	This study analyzes the differences in the beliefs of small business executives regarding the adoption of web-based e-commerce. Based on the Theory of Planned Behavior, behavioral, normative and control beliefs were compared of small business executives who had already adopted web-based e-commerce and those who had not yet adopted web-based e-commerce. There was a statistically significant difference between the two groups regarding the behavioral beliefs of enhancing the distribution of information, improving information accessibility, improving communication and increasing the speed with which the company gets things done. There was also a difference in the two groups regarding security, cost and training issues related to web-based e-commerce. Finally, there was a difference in the normative beliefs of the two groups. The adopters were influenced more by their social referent groups than were the non-adopters.
Robbins, Pantuosco, Parker & Fuller	An empirical assessment of the contribution of small business employment to US State economic performance	*Small Business Economics*	2000	*15*(4)	Small business Employment growth Gross state product Productivity Innovation Empirical study United States of	Small business proponents regularly couple their arguments for favourable government policies and reduced tax and regulatory burdens, to the presumed benefits of increased proportions of small versus large-sector employment. Though regularly espoused at both the state and national level, these presumptions regarding the benefits of small business employment remain an empirical issue. Are the presumed

					America	benefits a reality? A panel analysis of 48 U.S. States for a ten-year period was used to evaluate the contribution of small businesses to growth in productivity, growth in Gross State Product (GSP), unemployment, and wage inflation at the state level. The system of simultaneous equations revealed that states with higher proportions of very small business employment do indeed experience higher levels of productivity growth, and Gross State Product growth, while having less wage inflation and lower unemployment rates.
Roper, S.	Entrepreneurial characteristics, strategic choice and small business performance	*Small Business Economics*	1998	*11*(1)	Entrepreneurship Entrepreneurial characteristics Small business Innovation Strategic initiatives	Notions of entrepreneurship are central to accepted explanations of small business performance. The majority of studies exploring the growth implications of different entrepreneurial characteristics tend, however, to be partial or lack any formal structural framework. This leads to uncertainty concerning the mechanisms by which different entrepreneurial characteristics influence firm performance and the size of any effect. This paper develops a structural model of the relationships between entrepreneurial characteristics, firms' strategic choices and performance. The determinants of firms' strategic choices are then subjected to extensive empirical analysis. The results suggest a marked difference between the determinants of strategic initiatives related to management and control and those related to products, markets or managerial systems. Firms' propensity to make management and control initiatives depends almost exclusively on the characteristics of the entrepreneur. Firms' propensity to undertake initiatives related to new products, markets or management systems depends partially on the background of the entrepreneur but also reflects the firm's strategic targets, its market position and the likely operating environment.
Rothwell, R.	Venture finance, small firms and public policy in the UK	*Research Policy*	1985	*14*(5)	Small firms Innovation Job creation Loan Guarantee Scheme Business Expansion Scheme Venture capital United Kingdom	During the tenure of the current Conservative administration, public policy in Britain has very much favoured the smaller firm. This policy emphasis appears to be based on a belief in the superior job creating potential and innovatory capacity of smaller firms over their larger counterparts. Evidence presented in the paper shows that small firms have, indeed, made an important contribution to innovation in the UK and that their share of significant British innovations has increased significantly since the mid-1970s. An important aspect of

						small firm policy in the UK has been the introduction of several schemes designed to increase the flow of capital into the small firm sector, with special emphasis being placed on venture capital. The first of these schemes, the Loan Guarantee Scheme, has directed capital from the banks into over 14,000 small firms. The second scheme, the Business Expansion Scheme, has increased significantly the overall flow of venture capital and has biased investments towards start-up and early stage financing. These two schemes, together with the establishment of an Unlisted Securities Market, have provided some impetus to the development of private sector venture capital in Britain, which is growing apace. Essentially, the public sector schemes have underwritten the costs of entry to the venture capital market of both individual and institutional investors. In other words, they have had an important catalytic effect in stimulating the growth of private sector venture capital industry which is now the largest in Europe.
Scozzi, Garavelli & Crowston	Methods for modelling and supporting innovation processes in SMEs	*European Journal of Innovation Management*	2005	*8*(1)	Innovation Italy Modelling Small to medium-sized enterprises	Sets out to investigate business modelling techniques (BMTs) which can be used to support and improve innovation processes within small and medium-sized enterprises (SMEs). Based on a literature review, different analysis perspectives on innovation processes are identified and discussed, and some firm needs and problems are pointed out. The importance of BMTs to firms is further tested by an empirical study whose initial results are reported. Finally, by matching problems and techniques characterized by the same ontology, the BMTs most suitable to address SME needs are identified and their role within the innovation process discussed. The main result of the paper is the identification of the problems facing SMEs in innovation processes and the possible support offered by BMTs. Though methods and models alone do not assure the success in the innovation development process (IDP), they are enabling factors and can support the creation of strategies, reasoning, insights and communication. The adoption of such BMTs, facilitating the codification of the characteristics of the IDP, might be particularly useful in those environments where, due to the lack of specialized resources, it is difficult to structure all of the information related to the innovation process and to exploit the related benefits and opportunities.

Shan, Walker & Kogut	Interfirm cooperation and startup innovation in the biotechnology industry	*Strategic Management Journal*	1994	*15*(5)	Small startup firms Interfirm cooperation Biotechnology Innovation Cooperative networks	This paper examines the association between interfirm cooperation and the innovation output of startup firms in the biotechnology industry. A reciprocal association is hypothesized. The results, however, show only that cooperation affects innovation. Several control variables are related to cooperation and innovation, especially the startup's position in the cooperative network.
Siu, W-s.	Marketing activities and performance: A comparison of the Internet-based and traditional small firms in Taiwan	*Industrial Marketing Management*	2002	*31*(2)	Small firm Marketing Internet-based Taiwan Chinese	Emerging technologies, notably, have redefined business by erasing the traditional boundaries of time and geography and by creating new virtual communities of customers, distributors and suppliers, with new demands for products and services. Are there any differences between the marketing practices of the Internet-based and traditional small firms? This paper analyses published, undisguised stories of 112 traditional and 26 Internet-based small firms in Taiwan. The research results suggest that the owner-managers of both traditional and Internet-based small firms concentrate on sales, product planning and customer relationships. However, the owner-managers of traditional small firms in Taiwan place emphasis on quality control, whereas their Internet-based counterparts concentrate more on product schedules, sales forecasts, sales control and marketing research. These results indicate that cyber entrepreneurs have higher levels of marketing education and backgrounds, conduct marketing planning periodically and frequently and perform professional marketing activities. The research findings tend to suggest that though traditional marketing tenets are still suitable in the cyber environment of Taiwan, the Internet-based small firms have to utilise innovative marketing techniques to suit and compete in the ever-changing Internet business environment.
Slater, Twyman & Blackman	The Smart way for patent information to help small firms	*World Patent Information*	2000	*22*(4)	Patent information Smart scheme awards Intellectual property rights (IPR) Innovation Technology SMEs UK	This article explores the value of patent information as a crucial factor in the assessment of government awards in the UK to technically innovative small firms. The Smart scheme provides a substantial boost to small and medium-sized enterprises (SMEs). Some of this help is financial, but they also get help in other ways, for example through the publicity and marketing opportunities the winning of an award creates. Also in many cases, they get the benefit of the patent search that the UK Patent Office carries out as a crucial part of the assessment of most applications. The awards can be used in a

						variety of ways to enhance the chances of a business getting their project completed and the corresponding product successfully launched into the marketplace. This embraces, inter alia, many of the costs of seeking protection for, and enforcement of, their intellectual property rights (IPR).
Sternberg & Wennekers	Determinants and Effects of New Business Creation Using Global Entrepreneurship Monitor Data	*Small Business Economics*	2005	*24*(3)	Studies Entrepreneurs Economic impact Startups	This paper is an introduction to the present special issue dedicated to scientific research using data collected as part of the Global Entrepreneurship Monitor (GEM) and considering new venture creation as the hallmark of entrepreneurship. After a short description of GEM's theoretical and methodological background, this introduction highlights the main results of seven papers which were presented at the First GEM Research Conference in Berlin from 1 to 3 April 2004. First, there is empirical evidence that the role of entrepreneurial activity differs across the stages of economic development, in that there appears to be a U-shaped relationship between the level of development and the rate of entrepreneurship. Consequently, a positive effect of entrepreneurial activity on economic growth is found for highly developed countries but a negative effect for developing nations. Second, it is shown that different types of entrepreneurship may have a different impact on a nation's innovativeness and economic growth rate. In particular, potentially high-growth business start-ups and so-called opportunity entrepreneurship enhance knowledge spillovers and economic growth. Third, entrepreneurship is again shown to be a regional event that can only be understood if regional framework conditions, including networks and regional policies, are taken into consideration.
Stewart Jr, Watson, Carland & Carland	A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers	*Journal of Business Venturing*	1999	*14*(2)	Entrepreneurship Entrepreneurial characteristics Small business Small business owners Innovation Risk taking Psychological profiles United States of America	Despite intensive inquiry, relatively little is known about the entrepreneur, the central figure in entrepreneurship. The question of how an individual who operates his or her own business differs from a corporate manager remains unanswered. In addressing this question, the primary purpose of this study was to investigate the potential of psychological constructs to predict a proclivity for entrepreneurship. The research model includes three classic themes in the literature: achievement motivation, risk-taking propensity, and preference for innovation. A survey of 767 small business owner-managers and corporate managers was assembled from

						a 20-state region, primarily the southeastern United States. The participants completed a questionnaire composed of the Achievement Scale of the Personality Research Form, the Risk-Taking and Innovation Scales of the Jackson Personality Inventory and questions pertaining to numerous individual and organizational variables. Respondents were first divided into two groups, managers and small business owner-managers. Subsequently, due to the often cited variations in entrepreneurs, the owner-managers were further categorized as either an entrepreneur or small business owner, using the widely cited Carland et al. (1984) theoretical definitions. Entrepreneurs are defined by their goals of profit and growth for their ventures and by their use of strategic planning. Alternatively, small business owners focus on providing family income and view the venture as an extension of their personalities. In this study, both groups of owner-managers were simultaneously compared with managers using hierarchical set multinomial LOGIT regression. The results indicated that the psychological constructs are associated with small business ownership, but with some important caveats. As hypothesized, those labeled entrepreneurs were higher in achievement motivation, risk-taking propensity, and preference for innovation than were both the corporate managers and the small business owners. This profile of the entrepreneur as a driven, creative risk-taker is consistent with much of the classic literature concerning the entrepreneur. Nonetheless, not all of the owner-managers fit this profile. When compared with managers, the small business owners demonstrated only a significantly higher risk-taking propensity. In terms of the constructs studied, the small business owners were more comparable to managers than to entrepreneurs. In addition to theoretical and methodological implications, the results presented here have important implications for small business owner-managers of both types. A major issue is the connection between the owner's psychological profile and the characteristics of the venture, including performance. It would appear that psychological antecedents are associated with owner goals for the venture. Some owners will be more growth oriented than will others, and performance should be assessed in light of the owner's

						aspirations for the venture. Moreover, owners should be aware of their own personality sets, including risk preferences, which may be more or less suited to different venture circumstances, including those with relatively high levels of risk. Planning in small businesses appears to enhance venture performance. Research has demonstrated the connections between psychological factors and planning behaviors in small businesses. Those labeled entrepreneurs in this study have goals of profit and growth, and tend to engage in more planning. An awareness of these psychological preferences and concomitant attention to planning behaviors have the potential to improve the performance of the venture, irrespective of owner aspirations. Venture teaming is becoming more popular among entrepreneurs. Balanced venture teams appear to improve the chances of entrepreneurial success (Timmons 1990), but a common source of conflict among venture team members is inconsistent or ambiguous motives for the new venture. Awareness of venture partners' psychological predispositions in areas such as risk-taking could be used to identify and reconcile areas of potential conflict, and enhance the planning process in the small firm. In sum, an individual's awareness of his or her psychological profile provides a number of advantages, not only to existing entrepreneurs, but also to aspiring entrepreneurs who should assess their perceived entrepreneurial opportunities against the backdrop of their psychological proclivity for entrepreneurship.
Tan, Fischer, Mitchell & Phan	At the Center of the Action: Innovation and Technology Strategy Research in the Small Business Setting	*Journal of Small Business Management*	2009	*47*(3)	Institutional Entrepreneurship Firms Configuration Construction Imagination Acquisition Performance Industry Science Fields	In this essay, we offer perspectives on the future of small business research. These comments cover a range of issues unique to the future of small-business-focused research from "somewhat-broad" to "more-narrow," and address: (1) the problems and promise of better theory building, (2) the range of opportunities for theory-building research, (3) new vantage points for theory-building using the "social responsibility" of small business as a research lens, and (4) the future direction of research in technological entrepreneurship. We conclude with a summary of this "look to the future," and call for the innovative and provocative research that can keep contemporary small business management research at the center of the academic action.

Tennant, C.	Measuring business transformation at a small manufacturing enterprise in the UK	*Measuring Business Excellence*	2007	*11*(4)	Business improvement Quality management United Kingdom	The purpose of this paper is to validate the applicability of Strategic Quality Management (SQM) methods at a UK based manufacturing Small to Medium Enterprise (SME) for changing the organisational culture and improving the business performance results. Action research was conducted in the form of a single company case study where an existing SQM methodology (Hoshin Kanri) was adapted and applied at the company. The paper finds that this application of Hoshin Kanri is particularly innovative, as Western applications of this Japanese approach at SMEs are few as reported in the academic literature. This achievement represents a significant delivery of a cultural transformation to achieve business transformation by adopting a holistic performance measurement methodology. The paper has limitations due to the single case study approach and possible influence of the researchers during the application. Further applications at other SME companies are required to verify the significant findings. The discussion and conclusions from this paper are practical and have business relevance to both manufacturing and service sector organisations. This paper focuses on UK industry, and is of value to both academics and practising managers at an international level.
Thomas, Packham, Miller & Brooksbank	The use of Web sites for SME innovation and technology support services in Wales	*Journal of Small Business and Enterprise Development*	2004	*11*(3)	Communications Innovation Small to medium-sized enterprises Technology led strategy Transfer Worldwide web	To stay at the forefront of new technology, small and medium-sized enterprises (SMEs) can be assisted through Internet and Web sites providing innovation and technology support services. The cost of the latest technology, including hardware, training and personnel, however, can be insurmountable for SMEs with limited financial and technological resources. The business support community in Wales is continually evolving its own Internet and Web site offerings to make sure that businesses, especially SMEs, are kept abreast of the latest innovations, most productive methods and provision of support services. Considers the provision of Web-based innovation and technology support in Wales and examines its coverage in relation to Welsh SMEs. Utilises a range of data collection techniques including interviews with policy makers and the analysis of reports and Internet sites.
Thomson & Gray	Determinants of management development in small	*Journal of Small Business and*	1999	*6*(2)	Evaluation Management	This paper examines statistically the determinants of management development in small businesses, based on the

	businesses	*Enterprise Development*			development Small- to medium-sized enterprises	results of a survey of 389 small businesses carried out in 1996. Generally, the immediate issues concern the factors that influence the development of owners and managers of growing and sustainable small businesses, considered by many to be the source of future innovation and jobs in both developed and developing economies. More particularly, the survey is part of a wider investigation into management development in Britain, and the paper parallels a previous analysis of statistical determinants based on a survey of larger businesses. While entrepreneurship has received a lot of attention in small business research, comparatively little attention has been paid to the development of management competencies in small firms. In the study reported here, regression analyses were used to develop a more detailed understanding of the factors which shape the amount and nature of management development in small businesses. The key research questions, in line with the previous analysis, are: (1) what are the relative importance of environmental and structural factors on the one hand, and strategic factors such as internal management development policy on the other, in explaining the amount and value of management development activity? (2) what does this tell us about the degree to which management development is determined by choice or circumstance? (3) what are the "drivers" of management development and their relative significance? (4) what factors are most influential in assessing the achievement of management development objectives?
Thong & Yap	CEO characteristics, organizational characteristics and information technology adoption in small businesses	*Omega*	1995	*23*(4)	CEO characteristics organizational characteristics adoption of information technology small businesses	The importance of information technology (IT) to businesses is widely acknowledged. Yet, while large businesses have been using computers for some time, small businesses have been slow in adopting IT. The literature on technological innovation suggests that there are two main classes of variables that are important in determining adoption of an innovation: individual characteristics and organizational characteristics. As IT can be viewed as a technological innovation, these two classes of variables are possible determinants of IT adoption. This paper examines the effect of three characteristics of the Chief Executive Officer (CEO) and three organizational characteristics on adoption of IT. The three CEO characteristics studied are CEO innovativeness,

						CEO attitude towards adoption of IT, and CEO IT knowledge. The three organizational characteristics studied are business size, competitiveness of environment, and information intensity. Six hypotheses were formulated and tested using data collected from a sample of 166 small businesses. The results suggest that notwithstanding the business size, CEO characteristics are important factors affecting IT adoption in small businesses. Small businesses are more likely to adopt IT when the CEOs are more innovative, have a positive attitude towards adoption of IT, and possess greater IT knowledge.
Thorpe, Ryan & Charles	Innovation and small residential builders: an Australian study	*Construction Innovation: Information, Process, Management*	2009	*9*(2)	Australia Construction industry Innovation Small to medium-sized enterprises	Through investigating the innovation-adoption process in smaller construction industry firms, this paper aims to ascertain the drivers of innovation in Australian small residential building firms, and determine how such firms develop or adopt innovations. The research thus provides a more thoroughly nuanced understanding of the innovation-adoption process within these firms. The research described in this paper was conducted among small residential housing contractors in South-East Queensland, Australia. This was undertaken by means of a semi-structured interview process, based on a questionnaire requesting information from owners or managers. Innovation in this sector is driven by general business concerns pertaining to maintaining overall competitiveness rather than specific client needs. The same firms also utilize supply-chain relationships and broader industry associations as sources of external knowledge. Despite this, better pathways to transfer externally generated knowledge require implementation, especially as a means to ensure continued sector growth and deliver public goods such as enhanced worker health and environmental sustainability. The paper highlights the current communication and informational disjuncture between research institutions and practitioners. As a result, workable suggestions for enhanced and meaningful interaction among firms, peak bodies and key research institutions are advanced. The study complements previous research on innovation development and adoption. Given that there is little previous research on the innovation-adoption process in the residential building sector, the paper provides an important counterpoint to studies that generally focus on much larger construction firms.

van Stel, Martin, & Roy	The Effect of Entrepreneurial Activity on National Economic Growth	*Small Business Economics*	2005	*24*(3)	Studies Entrepreneurs Economic development Economic growth Gross Domestic Product GDP Correlation analysis Economic theory Economic models	Entrepreneurial activity is generally assumed to be an important aspect of the organization of industries most conducive to innovative activity and unrestrained competition. This paper investigates whether total entrepreneurial activity (TEA) influences GDP growth for a sample of 36 countries. We test whether this influence depends on the level of economic development measured as GDP per capita. Adjustment is made for a range of alternative explanations for achieving economic growth by incorporating the Growth Competitiveness Index (GCI). We find that entrepreneurial activity by nascent entrepreneurs and owner/managers of young businesses affects economic growth, but that this effect depends upon the level of per capita income. This suggests that entrepreneurship plays a different role in countries in different stages of economic development.
Verhees, Meulenberg & Pennings	Performance expectations of small firms considering radical product innovation	*Journal of Business Research*	2010	*63*	Performance expectations Small firms Radical product innovation Market orientation Entrepreneurial orientation	Performance expectations influence business decisions such as investment decisions and demand for supplies, particularly in small firms with limited strategic planning. Despite widespread use of performance expectations by firms and governments when making sales forecasts and economic outlooks, surprisingly little research exists about how small firms form performance expectations. This paper contributes to reduce this knowledge gap by analyzing performance expectations of small firm managers operating in markets with radical product innovations. This paper proposes a model and hypotheses, which explain performance expectations of small firm managers based on firms' current success, radical product innovation, and variables that indicate firms' ability to respond to customer needs for radical product innovation. Data from 200 decision-makers in a real decision-making context support the model. The results show that performance expectations in small firms are only to a limited extent a naïve extrapolation of current success: radical product innovation and small firm's ability to respond to customer needs for radical product innovation influence performance expectations.
Wagner & Hansen	Innovation in large versus small companies: insights from the US wood products industry	*Management Decision*	2005	*43*(6)	Chile Innovation Process management Product innovation	Aims to explain the effect of firm size on company innovation inside one industry context: the wood products industry. The strategic issues under study (innovation, corporate strategy) are typically managed by the firm's top executives. Also

					United States of America Wood products	important is the fact that the response rates of questionnaires targeting this group are generally very low. Consistently, the data for the project were obtained from 43 in-person interviews with top executives of wood products companies of different sizes in two countries, i.e. the USA and Chile. Finds that firm size does impact the innovation type pursued by companies, at least in the wood products industry. Indeed, large companies of this study clearly outrun smaller companies in process innovation. However, our analysis also shows that small companies level the field with larger companies when considering all three innovation types (process, product, business systems). The capital enjoyed by large companies allows them to excel in process innovation. This article suggests that managers of small companies should compete in a different arena from large companies and emphasize product and business systems innovation, as they can do very well in these areas even with limited resources. There is very little research about innovation in the wood products industry. This article contributes to the knowledge in this area, also providing new insights about the validity of Schumpeter's assertions regarding the role of company size in innovation.
Walker & Preuss	Fostering sustainability through sourcing from small businesses: public sector perspectives	*Journal of Cleaner Production*	2008	*16* (15)	Sustainability Small businesses SMEs Procurement Local government Health care	This article examines the opportunities for fostering sustainable development through public sector sourcing from small- and medium-sized enterprises (SMEs). Buying from small businesses can make such contributions in a variety of forms, ranging from a contribution to local economic development through providing innovative green products and services, particularly in the food sector, to helping the public sector organisation to better align its operations with its community. Sourcing from small businesses also has implications for the governance of sourcing processes and can benefit from a partnership approach. Barriers to public sector sourcing from small businesses are discussed and suggestions made on how these can be overcome.
Wallsten, S. J.	The effects of government-industry R&D programs on private R&D: The case for the small business innovation research program	*The RAND Journal of Economics*	2000	*31*(1)	Research & development R&D Grants Business-government	It is asked whether government-industry commercial R&D grants increase private R&D. Regressing some measure of innovation on the subsidy can establish a correlation between grants and R&D, but it cannot determine whether grants increase firm R&D or whether firms that do more R&D

					relations Private sector Studies Economic models Economic theory Small business Innovations	receive more grants. Using a dataset of firms involved in the Small Business Innovation Research (SBIR) program, a multi-equation model is estimated to test these hypotheses. Firms with more employees and that appear to do more research win more SBIR grants, but the grants do not affect employment. Moreover, evidence is found that the grants crowd out firm-financed R&D spending dollar for dollar.
Ward, Runcie & Morris	Embedding innovation: design thinking for small enterprises	*Journal of Business Strategy*	2009	*30* (2/3)	Brands Corporate strategy Design Innovation Shopfloor Small to medium-sized enterprises	This paper aims to outline the approaches used by the UK Design Council to embed design and innovation capability in small businesses. Case studies of Design Council programmes are outlined and the design methods, tools and processes used to embed design-led innovation are explored. These are grouped under five headings: vision and strategy; brand and identity; product and service; user experience and innovative culture. The paper finds that programmes which use design thinking, design mentoring and co-creation to help companies develop innovation capacity result in tangible business benefits. This overview of design methods in practice creates a compelling case for the strategic deployment of design-led innovation.
White, Gorton & Chaston	Facilitating Co-Operative Networks of High-Technology Small Firms: Problems and Strategies	*Journal of Small Business and Enterprise Development*	1996	*3*(1)	Small and medium – sized enterprise Innovation High technology Competitive advantage Core competencies Network brokers Growth orientations	The growing importance of small- and medium-sized enterprises (SMEs) in high-technology innovation and the importance of innovation in maintaining competitive advantage has been acknowledged. The possibilities of co-operation between high-technology SMEs as a mechanism for enhancing individual firm growth is considered. The current stock of empirical evidence on high-technology SMEs is outlined and the fact that few small firms achieve substantial growth highlighted. The major barriers to growth which lie behind this outcome are considered. The possibilities of networking, in its various forms, are considered as a facilitating medium for aiding business growth, with particular attention paid to high intensity co-operative arrangements. The need for heterogeneous skill possession is emphasized, and how environments comprising homogeneous core competencies make networking an inappropriate solution for business growth. The existing empirical data on SME networking is considered and the relative costs and benefits of membership tabulated on the basis of network type. This leads on to an analysis of how beneficial, long-term arrangements

						between actors may not occur in the market because of short-term risks associated with other party(ies) defecting, as can be modelled within a prisoner's dilemma game theory structure. The final section discusses the possible role for network brokers in lessening these risks and aiding the development of mutually beneficial, growth-oriented relationships between high-technology SMEs.
Wright & Nancarrow	Improving marketing communication & innovation strategies in the small business context	*Small Business Economics*	2001	*16*(2)	Studies Small business Inventors Innovations Market strategy Economic planning	While inventions and innovations make significant contributions to the growth and competitiveness of national economies, there are problems in the UK surrounding independent inventors (often a small, one person business) and their marketing, where there has been failure to stimulate and exploit inventions compared to other industrialized countries. There are long term implications for economic competitiveness when new ideas are lost. Organizations pursue innovations as an important route in the search for competitive advantage, but this route is fraught with difficulties for independent inventors in getting organizations to accept their products and to market them. This paper reports from and builds on an earlier study from a small business perspective which focuses, firstly, on the importance of capitalizing on this source of embryonic talent and secondly, the problems within the marketing communication process between potential adopter marketing organizations and independent inventors.
Wright, Palmer & Perkins	Types of product innovations and small business performance in hostile and benign environments	*Journal of Small Business Strategy*	2005	*15*(2)	Innovations Small business Studies Regression analysis Financial performance	The relationship between innovation and performance has been widely studied. In addition, many studies have examined moderating effects of types of competitive environments on this relationship. However, little work has been done to examine how specific types of product innovation strategies are related to performance in hostile and benign environments. Using results from a survey of a sample of small businesses, this paper used regression analysis to examine how degree of change in new product offerings and number of new product lines were related to satisfaction with financial performance. While neither type of innovation was related to satisfaction with performance in benign environments, the number of new lines developed was positively related to satisfaction with financial performance in hostile environments. The results from this sample indicate that the strategy of innovation

						through development of more new product lines may be preferable to developing dramatic innovations for small businesses in a hostile external environment.
Xu, Lin & Lin	Networking and innovation in SMEs: evidence from Guangdong Province, China	*Journal of Small Business and Enterprise Development*	2008	*15*(4)	China Innovation Networking Small to medium-sized enterprises	This paper aims to investigate structural characteristics of a business network comprising small and medium-sized enterprises (SMEs), and to explore the relationships between such network characteristics and innovative capabilities of the participating firms. This paper adopts a survey approach and conducts empirical analysis by drawing data from 92 firms operating in the packaging and printing industry in Shantou City, Guangdong Province. In relation to the participating firms' innovative capabilities, density, reciprocity and multiplicity of the business network are figured out as factors with positive association, while hypotheses concerning intensity, non-redundancy and betweenness of the network are not supported. The authors only conducted a survey in a single industry in one location. Thus the extent to which the results of this study can be generalized remains to be further investigated. Small and medium-sized enterprises can enhance their innovative capability by understanding and leveraging the structure of the business network in which they participate. This paper sheds additional insights to the relationship between a business network and firms' innovative capabilities in a Chinese context.

Appendix 3: Primary data questionnaire

Small Business Innovation: Identifying the enablers of innovation in North Queensland.

Q1a. *Looking at the bottom half of the Showcard 1, which category group best describes the industry you are in?* ☐ **Please say a number**

Q1b. *Looking at the top half of Showcard 2, which one line best describes how you first got into this business?* ☐ **Please say a number**

Q1c. *Now looking at the bottom half of Showcard 2, how long has the business been in operation under the current ownership within this same industry?*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3-4	5-6	7-8	9-10	11-15	16-20	21-25	26+

Q2. *Apart from yourself, how many full-time & part-time employees do you currently have?*
Do not include subcontractors, volunteers or consultants.

Single ☐ Full-time ☐ Part-time ☐

Q3a. *Using a Yes or No answer, do you know what the term innovation means?*

(1) Yes **(0)** No

(If YES ask Q3b, otherwise goto Q4a.)

Q3b. *In your own words how would you describe or define what innovation means?*

Q4a. *Looking at Showcard 3, there it gives a definition of innovation. Please read, then using the 5 point scale below, how important / unimportant do you think innovation is to the overall success of your business?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q4b. *Why do you say that?*

Q5a. *Now looking at Showcard 4, which of the following activities, if any, did your business undertake in the last 12 months?* **Please say the number at start of each line.**

Q5b. Still looking *at Showcard 3, what was the one most important activity that contributed to the overall profitability of the business over the last 12 months?*

☐ **Please say a number**

Q5c. *Again looking at Showcard 3, what were the other two main activities that contributed to the overall profitability of the business over the last 12 months?*

☐☐ **Please say the numbers**

Q5d. *Were there any other activities not mentioned on Showcard 3 that contributed to the overall profitability of the business over the last 12 months?*

Q5e. Now *using a scale of 1-5 on the bottom section of Showcard 4, where 1 is Very Dissatisfied and 5 is Very Satisfied, how would you rate the performance levels of the activities you mentioned in contributing to the overall profitability of the business over the last 12 months?*

Very Dissatisfied		Neither satisfied Nor dissatisfied		Very Satisfied
1	2	3	4	5

Q6a. *Turning to Showcard 5, there are listed a range of good and services. Which of those goods or services did the business* ***newly introduce, or significantly improve****, over the last 3 years?*

Q6b. *Still looking at Showcard 4, which of those goods and services you mentioned were* ***completely new*** *to your business over the last 3 years?*

Q6c. *Now thinking back to your answers for Q6a, which of the goods and services newly introduced, or significantly improved over the last 3 years, if any, were designed for export markets?*

Q7a. *Using the scale of 1-5 on the top half of Showcard 6, where 5 is All the Time and 1 is Not At All, how often would you participate in the following activities and procedures that could assist the business to build innovation capabilities?*

Regularly introduce new products	1 2 3 4 5
Seek out what competitors are doing	1 2 3 4 5
Actively seek customer feedback	1 2 3 4 5
Actively improve service delivery	1 2 3 4 5
Encourage new ideas from staff	1 2 3 4 5
Introduce what competitors are doing	1 2 3 4 5
Act on customer feedback	1 2 3 4 5
Reward staff for new ideas	1 2 3 4 5
Foster no-blame work environment	1 2 3 4 5
Maintain links with similar businesses	1 2 3 4 5
Spending on research & development	1 2 3 4 5
Plan for new products/services	1 2 3 4 5
Pay for/subsidise staff training	1 2 3 4 5
Introduce new marketing techniques	1 2 3 4 5
Improve management processes	1 2 3 4 5
Purchase new equipment/machinery	1 2 3 4 5
Trial new operational procedures	1 2 3 4 5
Attend industry conferences/seminars	1 2 3 4 5
Form industry partnerships/alliances	1 2 3 4 5
Sponsor industry research	1 2 3 4 5
Collaborate with suppliers	1 2 3 4 5
Trial new distribution channels	1 2 3 4 5
Research industry/trade publications	1 2 3 4 5

Q7b. *Are there any other activities not mentioned that you undertake to build innovative capability?*

Q7c. *Now thinking in general and using the scale from the bottom of the page, how important or unimportant generally do you think it is for small businesses to plan for the introduction of new, or significantly improved, goods & service?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q8a. *Looking at the top of Showcard 7 are listed various conditions where businesses may adopt new types of processes, products or management procedures to build their innovation capability. Under which of those conditions have you adopted new processes, products or management procedures to build your business' innovation capability?* **Please choose multiple answers**

Q8b. *Are there any other conditions not mentioned on the card which are relevant?*

Q8c. *Next thinking about how long it takes for you to see or hear of something new, either a process, product or management procedure, before you adopt them into your own business. Looking at the bottom of Showcard 7 are listed various timeframes, which one best describes how long it would normally take to adopt a new process, product or management procedure into the business?*

☐ **Please say number**

Q9a. *Turning over the page to Showcard 8 and now thinking about collaboration activities. What are the main types of collaboration activities that your business has participated in over the last 12 months?* **Please choose multiple answers**

(If no answers goto Q9g)

Q9b. *Are there any other collaboration activities not mentioned on the card the business has participated in?*

Q9c. *Still thinking about the main collaboration activities your business participated in over the last 12 months: which one type of collaboration activity was most successful in terms of helping the business build innovation capability?*

☐ **Please say one number only**

Q9d. *Again thinking about the main types of collaboration your business participated in over the last 12 months: which one type of collaboration activity was least successful in terms of helping the business build innovation capability?*

☐ **Please say one number only**

Q9e. *Now looking at the middle section of Showcard 8 and thinking about the collaboration activities undertaken. What types of organisations or businesses did you collaborate with over the last 12 months?* **Please choose multiple answers**

Q9f. *Of the organisations and businesses you collaborated with over the last 12 months, which one organisation or business proved the most beneficial in terms of helping your business build innovation capability?*

☐ **Please say number**

Q9g. *Finally, using the scale of 1-5 at the bottom of the page, where 1 is Extremely Important and 5 is Not At All Important, how would you rate the overall importance of collaboration in helping your business build innovation capability?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

Q10a. *Looking now at the top of Showcard 9, could you please say the number after the highest level of education you have achieved?*

☐ **Please say number**

Q10b. *Using the scale in the middle of Showcard 9, how likely or unlikely are you personally to undertake a tertiary course (including TAFE) or training program to improve your skills and upgrade your knowledge about innovation within the next 12 months?*

Not at all Likely		Somewhat Likely		Extremely Likely
1	2	3	4	5

Q10c. *Finally, looking at the bottom of Showcard 9 and using the scale from 1-5, where 1 means Not At All Important, and 5 is Extremely Important, how important do you think it is to be involved in a continual learning process?*

Not at all Important		Somewhat Important		Extremely Important
5	4	3	2	1

Q11a. *Looking now again at the top of Showcard 9, could you please estimate the overall average of the highest level of education your staff have achieved?*

☐ **Please say number**

Q11b. *Next, thinking about when you employ new staff. Do you specifically look for people who have some form of tertiary education such as a degree, diploma or certificate?*

(1) Yes **(0)** No

Q11c. *Still looking at bottom of Showcard 9 and using the scale in the middle of the page, where 5 is Extremely Important and 1 is Not At All Important, how would you rate the overall importance of employing staff who have some form of tertiary education in helping your business build innovation capabilities?*

Not at all Important		Somewhat Important		Extremely Important
1	2	3	4	5

11d. *Now the scale in the middle of Showcard 9, how likely or unlikely are you to pay for, or provide flexible hours, so your staff can attend tertiary courses (including TAFE) or training programs to improve their skills and upgrade their knowledge about innovation within the next 12 months?*

Not at all Likely		Neither Likely Nor Unlikely		Extremely Likely
1	2	3	4	5

Q11e. *Finally, back to the bottom of Showcard 9 and using the 1-5 scale, where 1 means Not At All Important, and 5 is Extremely Important, how important do you think it is for your staff to be involved in a continual learning process?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q12a. *Next, thinking about how you obtain new ideas and acquire new knowledge? Do you get most of your ideas and knowledge from external sources?*

(1) Yes **(2)** No

Q12b. *Turning to Showcard 10 are listed various ways and methods to obtain new ideas and acquire new knowledge. Where do you get most of the ideas you use in your business over the last 12 months?*

Q12c. *Are there any others ways or methods of sourcing external ideas and knowledge not mentioned on the card?*

Q12d. *Thinking now about how long it takes before you implement new ideas or knowledge into your own business. Looking at the bottom of Showcard 10 are listed various timeframes, which one best describes how long it would normally take to implement new ideas or new knowledge into the business?*

☐ **Say the number**

Q13a. *Have you ever employed the services of any outside consultants to provide research and development advice or services to your business?*

(1) Yes **(2)** No

(If Yes ask Q13b, otherwise goto Q14)

Q13b. *Now looking at Showcard 11 are listed a range of services and advice offered by outside consultants. Which of those were provided by the consultant you engaged?*

Q14a. *Looking now at Showcard 12 there are listed a range of Human Resources Management processes and incentives. Which, if any, of those processes and incentives do you use for rewarding your staff?*

Q14b. *Are there any others HR processes and incentives not mentioned on the card that you have used for rewarding your staff?*

Q14c. *Now looking at the 1-5 scale at the bottom of the page, how important or unimportant do you think it is to have flexible work hours for your employees to attend skills training or professional development courses?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q14d. *Using the same scale at the bottom of the page, how important or unimportant do you think it is to pay for, or financially subsidise, your employees to attend skills training or professional development courses?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q14e. *Finally, (same scale) how important do you think it is to give empowerment to your employees, that is to give them decision making authority and for them to be accountable for those decisions?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q15. Still *looking at the bottom of the page and using the scale from 1-5, where 5 is Extremely Important and 1 is Not at all Important, how would you rate the importance of having good staff to the overall success of a small business?*

Not at all Important		Moderately Important		Extremely Important
1	2	3	4	5

Q16a. *Now thinking about planning for innovation and using the scale from 1-5 on the top Showcard 13, where this time 1 is Extremely Important, and 5 is Not at all Important, how important or unimportant do you think it is to use some form of planning procedures for innovation activities?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

Q16b. *Still using the scale from 1-5 on Showcard 13, how important or unimportant do you think it is to use formal, or written, planning procedures for innovation activities?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

Q17. *During the past 12 months how many patents, registered Trademarks, or legal protection for any intellectual property have you taken out? (Such as product or process design, operational procedure, service delivery process or management styles)*

☐ **Patent applications**

☐ **Trademark registration**

☐ **Intellectual property protection**

Q18a. *Now thinking of small businesses in general and still using the scale on Showcard 13, how important or unimportant do you think it is for a small business to be innovative with their products and services they provide to customers?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

Q18b. *Do you have a set procedure or department for dealing with customer feedback or suggestions about products or services?*

(1) Yes **(0)** No

Q18c. *Next thinking of small business customers in general and still using the scale on Showcard 13, how important or unimportant do you think it is for a small business to listen to their customers' feedback about the products and services they provide?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

Q18d. *Still on customers, but now thinking about complaints and using the scale on Showcard 13, how important or unimportant do you think it is for customers to complain about the products and services they receive if the are unhappy with them?*

Not at all Important		Moderately Important		Extremely Important
5	4	3	2	1

The final sets of questions are classification questions, and are asked in order to group you & your business into specific categories.

Q19. *Now by using 5 years spans (20-24, 25-29) could you please tell me your approximate age?*

20-24…**1**	25-29…**2**	30-34…**3**	35-39…**4**
40-44…**5**	45-49…**6**	50-54…**7**	55-59…**8**
60-64…**9**	65-69…**10**	70+…**11**	

Q20a. *Looking at the middle of Showcard 13, could you tell me what your current position is within the business?*

☐ **Say the number**

Q20b. *Finally looking at the bottom Showcard 13 could you please say the number beside the estimated range of total revenue the business made in the last financial year?*

☐ **Say the number**

Closing statement and thank you for participating in survey: Greatly appreciated.

Would your business like to receive a copy of the final results from the survey?

Email:.....
Postal Address:

Appendix 4: Questionnaire support showcards

SHOWCARDS

The Determinants of Small Business Innovation: A North Queensland Perspective

Researcher
David Cummins

A study for Doctorate of Philosophy
James Cook University: School of Business

SHOWCARD 1 - Industry Classification

(1) Mining

Coal and metal ore mining; Oil and gas extraction; Non metallic mineral mining and quarrying; Exploration; Mining support services.

(2) Manufacturers

Food product - dairy, seafood processing, fruit and vegetable processing, bakery products, grain mill and cereal products; Beveridge and tobacco products; Clothing and footwear; Wood products; Printing and printing support services; Petroleum and coal products; Chemical products; Polymer and rubber products; Fabricated metal products; Transport equipment; Machinery and electrical equipment; Furniture and specialised products.

(3) Electricity, Gas and Water Supply

Electricity supply; Gas supply; Water supply, sewage and drainage services; Waste collection, treatment and disposal services.

(4) Construction

Residential and non-residential building construction; Heavy and civil engineering construction; Construction services - land development and site preparation services; Building structure services - carpenter, bricklayer, concretor; Building installation services - tilelayer electrician etc; Building completion services - painting contractor, landscape gardener.

(5) Wholesale Trade

Basic material wholesaling - agricultural products, metal and chemicals, timber and hardware goods; Machinery and equipment; Motor vehicle and motor vehicle parts; Grocery liquor and tobacco products; Other goods -- textiles, clothing, footwear, pharmaceuticals, toiletries, furniture, floorcoverings.

(6) Retailers

Motor vehicle, motor vehicle parts and tyres; Fuel retailing; Food retailing -- supermarket and grocery stores, specialised food; Other store-based retailers -- furniture, floorcoverings, housewares, textile goods, electrical, hardware and building and garden supplies, recreational goods, clothing, footwear, departments stores, pharmaceuticals and specialty stores; Non-store retailing and commission based by name and/or selling

(7) Accommodation, Cafes and Restaurants

Motels and serviced apartments; takeaway food services; pubs, taverns and bars; hospitality club's.

(8) Transport and Storage

Road transport -- freight and passenger services; water transport; Air passenger and freight services; Scenic and sightseeing operators; Postal and Courier pickup and delivery services; Transport support services; Warehousing and storage services.

(9) Communication Services

Publishing; Movie & recording; Broadcasting; Internet publishing and broadcasting; Telecommunications services; Internet service providers -- Web search portals and data processing services; Information services.

(10) Finance and Insurance

Financial services; Financial advisers; Financial asset investors; Life insurance brokers; Health and general insurance; Superannuation funds; Auxiliary insurance and Finance investment services.

(11) Property and Business Services

Real estate agents; Office and commercial property cleaning services; Accountants and book-keeping services, Printing services, Business advisors and consultants; Equipment hire services; Marketing consultants, Advertising agency, etc.

(12) Cultural and Recreational Services

Theme and entertainment park operators; Private art galleries; Special event or activity operators – sailing, skydiving, scuba diving, marine cruises; Personal and private household service providers including: Lawn mowing and gardening services; washing and ironing services; pet grooming; hairdressing services; personal coaching or trainer; music teaching and tutoring; dance instructor; driving instructors; domestic cleaning services; repair and maintenance services etc.

SHOWCARD 2

How first entered the business

(1) Started business from scratch

(2) Successfully applied for advertised position

(3) Family member coming into business

(4) Bought the advertised business already established

(5) Part of Management Buy Out (MBO) group

(6) Merged previous business with another established business

(7) Some other way – Give details

Years in Operation

1. **3 – 4 years**
2. **5 – 6 years**
3. **7 – 8 years**
4. **9 – 10 years**
5. **11 – 15 years**
6. **16 – 20 years**
7. **21 – 25 years**
8. **Over 26 years**

SHOWCARD 3

Definitions of Innovation

The term ***innovation*** refers to the process of developing, introducing and implementing a new or significantly improved good or service or a new or significantly improved process. ABS, 2003

An ***innovation*** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. OECD, 2005

Level of Importance of Innovation to Overall Business Success

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
1	**2**	**3**	**4**	**5**

SHOWCARD 4

(1) Production related activities

i. Purchase new machinery or equipment

ii. Purchase of licencing or manufacturing rights

iii. Form external research & development partnerships

iv. Take out patents or intellectual property protection

(2) Development related activities

i. Undertaking specialised training courses

ii. Develop new marketing and promotion campaigns

iii. Research and development of new markets

iv. Conduct product research and development in-house

v. Conduct market and customer research in-house

vi. Purchase external research and development information

(3) Organisational related activities

i. Developed and implement the new business strategy

ii. Introduce new management techniques

iii. Significantly change business /organisational structure

iv. Significantly change marketing campaigns and strategies

v. Introduce new stock control methods

vi. Introduce/improve information sharing

vii. Regular scanning for new ideas, products, services or processes externally

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Very Dissatisfied	Fairly Dissatisfied	Neither /nor Satisfied	Fairly Satisfied	Very Satisfied
1	**2**	**3**	**4**	**5**

SHOWCARD 5

New goods

1) Environmentally friendly manufacturing processes

2) Use of environmentally friendly manufacturing materials

3) Introduction of smart card or loyalty programs

4) Use of recycled paper or other recycled materials

5) Development of flexible customer service programmes

6) Purchasing of global positioning systems for vehicles

7) Introduction of the new multimedia applications

8) Introduction of environmentally friendly cleaning products

New services

9) Provide extended or customised warranty on goods sold

10) Introduction of pickup and delivery services

11) Establishing website for sales and information over the Internet

12) Combining existing services into new services package

13) Installation of electronic clearing systems

14) Provision of new or improved insurance cover

15) Introduction of automated customer enquiry systems

16) Introduction of electronic bill payment systems

17) Offering obsolete product recycling service

18) Offering free advisory service

SHOWCARD 6

How often would you participate?

Not at All	A little bit of the Time	Some of the Time	Fairly Regularly	All the Time
1	**2**	**3**	**4**	**5**

Importance of Planning for Innovation

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
1	**2**	**3**	**4**	**5**

SHOWCARD 7

Reason or Conditions for introducing innovation

1) Decreasing sales revenues

2) New competitors entering market

3) High turnover of staff

4) Requirement for extra finance

5) Increase in overhead costs

6) Decrease in availability of vital resources

7) Decrease in availability of key suppliers

8) Changes in external operating environment

9) Changes in government regulations

10) Changes to industry compliance regulations

Time taken to adopt new products, processes or new management procedures

1. **1- 2 Weeks**
2. **3 – 4 Weeks**
3. **1- 2 Months**
4. **3 – 6 Months**
5. **7- 12 Months**
6. **13 - 18 Months**
7. **19 – 24 Months**
8. **2 - 3 Years**

SHOWCARD 8

Types of collaboration activities undertaken

1. Formed a marketing or distribution alliance
2. Formed in manufacturing partnership
3. Participated in joint research and development
4. Formed other joint-venture outside of the industry
5. Undertook a licensing agreement
6. Participated in other form of collaboration/alliance

Types of organisations collaborated with

1. As a member of a state/national industry group
2. Suppliers of raw materials, equipment or components
3. Existing clients or old customers
4. Competitors or businesses in the same industry
5. Businesses or suppliers from different industries
6. Developers, industry advisers and consultants
7. Universities or TAFE colleges
8. Independent non-profit research organisations
9. R&D organisations or commercial laboratories
10. Other types of joint-venture organisations

Importance rating of collaboration

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
5	**4**	**3**	**2**	**1**

SHOWCARD 9

1. Finished primary school

2. Some secondary school

3. Some technical or trade/commercial training

4. Passed School Certificate, 4th form, Year 10, Intermediate

5. Passed Leaving/Sub-senior Certificate, 5th form, Year 11

6. Finished TAFE/Commercial College, Trade Certificate or Apprenticeship

7. Finished Matriculation, Senior Certificate (H.S.C.) (V.C.E.) or Year 12

8. Some University or College of Advanced Education

9. Diploma/Certificate from College of Advanced Education or TAFE

10. Degree from University or College of Advanced Education

11. Higher Degree or Higher Diploma, eg. PhD, Masters

Likelihood to undertake tertiary course or training program

Very Unlikely	Fairly Unlikely	Neither Likely nor Unlikely	Fairly Likely	Very Likely
1	**2**	**3**	**4**	**5**

Importance of continual learning and training

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
1	**2**	**3**	**4**	**5**

SHOWCARD 10

1. **Internal sources**
   1.1. From staff and employees within the business
   1.2. Through membership of industry group
   1.3. From friends and associates
2. **Market sources**
   2.1. Existing clients and new customers
   2.2. Suppliers of goods, equipment and materials
   2.3. Consultants or advisers
   2.4. Competitors and other businesses from same industry
3. **Institutional sources**
   3.1. Universities and TAFE colleges
   3.2. Government agencies and departments
   3.3. Independent non-profit research organisation's
   3.4. Commercial labs and industry funded R&D organizations
4. **Alternative sources**
   4.1. Professional conferences, trade fairs, exhibitions and seminars
   4.2.Industry websites and trade publications
   4.3.Academic and industry research journals
   4.4.Other sources of ideas not previously mention

Time taken to adopt new ideas or new knowledge

1. **1- 2 Weeks**
2. **3 – 4 Weeks**
3. **1- 2 Months**
4. **3 – 6 Months**
5. **7- 12 Months**
6. **13 - 18 Months**
7. **19 – 24 Months**
8. **2 - 3 Years**

SHOWCARD 11

Consultancy Services and Advice

1. Marketing strategy planning and advice
2. Advertising and promotion production
3. Public relations or sponsorship advice
4. Market and customer research services
5. Financial planning and investment advice
6. Accountancy and taxation advice
7. Business systems and operational planning development
8. Logistics and distribution planning
9. Supplier and procurement advice
10. Human resources management advice
11. Merger and acquisition advice
12. Total quality management (TQM) advice

SHOWCARD 12

Human Resources Management Practices

1. Human resources and recruitment plans
2. Formal employee induction procedures
3. Formalised Job Analysis procedures
4. Formalised Job Design descriptions
5. Regular staff performance appraisals
6. Employee learning, training, and development program
7. Formal Industrial Relation (IR) procedures
8. Formalised Occupational Health & Safety procedures
9. Equal Employment Opportunity (EEO) policy
10. Pay above industry average wages
11. Bonus reward or incentive payment schemes
12. Flexible working hours and job rotation
13. Open-book or open-door communication policy
14. Employee empowerment procedures
15. Regular staff feedback meetings

Importance rating

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
1	**2**	**3**	**4**	**5**

SHOWCARD 13

Importance rating

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
5	**4**	**3**	**2**	**1**

Current Position or Title

1. Sole Operator
2. Owner, partner or proprietor
3. Managing Director
4. General Manager
5. Department Manager
6. Supervisor/2IC
7. Administration Officer
8. Foreman

Estimated total revenue last financial year

1. Up to $50,000
2. $50,000 -$100,000
3. $100,000 -$250,000
4. $250,000 – $500,000
5. $500,000 – $750,000
6. $750,000 – $1 Million
7. $1 –$2 Million
8. Over $2 Million

Appendix 5: Output tables from Principal Component factor analysis

Communalities

Original variable	Initial	Extraction
Q7_1	1.000	.675
Q7_2	1.000	.584
Q7_3	1.000	.784
Q7_4	1.000	.726
Q7_5	1.000	.730
Q7_6	1.000	.596
Q7_7	1.000	.613
Q7_8	1.000	.619
Q7_9	1.000	.803
Q7_10	1.000	.667
Q7_11	1.000	.795
Q7_12	1.000	.605
Q7_13	1.000	.560
Q7_14	1.000	.676
Q7_15	1.000	.650
Q7_16	1.000	.679
Q7_17	1.000	.685
Q7_18	1.000	.509
Q7_19	1.000	.676
Q7_20	1.000	.613
Q7_21	1.000	.676
Q7_22	1.000	.594
Q7_23	1.000	.637

Extraction Method: Principal Component Analysis

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.923	21.404	21.404	4.923	21.404	21.404	2.260	9.825	9.825
2	2.035	8.846	30.250	2.035	8.846	30.250	2.159	9.387	19.212
3	1.940	8.436	38.686	1.940	8.436	38.686	2.049	8.909	28.121
4	1.522	6.615	45.302	1.522	6.615	45.302	2.019	8.778	36.900
5	1.379	5.996	51.298	1.379	5.996	51.298	1.829	7.953	44.853
6	1.245	5.415	56.713	1.245	5.415	56.713	1.690	7.347	52.200
7	1.102	4.792	61.505	1.102	4.792	61.505	1.633	7.099	59.299
8	1.007	4.378	65.883	1.007	4.378	65.883	1.514	6.584	65.883
9	.879	3.822	69.705						
10	.859	3.734	73.439						
11	.819	3.563	77.002						
12	.727	3.161	80.163						
13	.682	2.967	83.129						
14	.588	2.555	85.684						
15	.521	2.266	87.950						
16	.516	2.245	90.195						
17	.451	1.963	92.158						
18	.403	1.752	93.910						
19	.362	1.573	95.483						
20	.354	1.537	97.020						
21	.282	1.226	98.246						
22	.237	1.032	99.279						
23	.166	.721	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
Q7_1	.550	-.060	-.148	.321	-.213	-.323	-.248	-.182
Q7_2	.452	-.148	.262	.212	-.453	-.092	.141	-.100
Q7_3	.322	-.679	-.111	.265	.303	.128	-.081	.149
Q7_4	.469	-.493	-.011	.002	.046	.473	-.159	-.106
Q7_5	.529	.270	-.556	-.164	.010	.000	.041	-.200
Q7_6	.499	-.049	-.082	.361	-.261	.333	.138	.099
Q7_7	.341	-.445	-.163	-.104	.404	-.287	-.118	-.040
Q7_8	.518	-.064	-.561	.043	.104	-.047	-.128	-.039
Q7_9	.241	.214	-.639	.276	.254	.046	.378	.072
Q7_10	.440	.378	.079	.018	.101	.240	-.202	.464
Q7_11	.473	-.110	.237	-.081	-.042	-.441	.274	.474
Q7_12	.579	-.046	.207	.004	-.154	.031	.390	-.220
Q7_13	.384	.465	-.213	-.317	-.068	.083	-.023	.194
Q7_14	.561	-.254	.018	-.212	-.223	.025	.383	.236
Q7_15	.560	-.191	.082	-.465	.241	.070	-.065	.095
Q7_16	.544	.199	.169	-.278	-.071	.252	-.021	-.411
Q7_17	.606	-.058	.142	-.191	-.341	.127	-.349	.064
Q7_18	.497	.290	.228	-.096	.308	-.019	-.144	.002
Q7_19	.153	.229	.590	.314	.342	.149	-.100	.068
Q7_20	.309	.041	.309	.372	.384	.131	.289	-.182
Q7_21	.344	.450	-.110	.523	-.122	-.035	-.204	.107
Q7_22	.474	-.071	.138	.160	-.037	-.491	-.263	-.090
Q7_23	.472	.343	.198	-.172	.288	-.259	.165	-.224

Extraction Method: Principal Component Analysis.
a. 8 components extracted.