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Sarel Gronum

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THE UNIVERSITY OF QUEENSLAND  
AUSTRALIA

**SME Performance: The Role of Networking, Innovation Breadth, and Business Model Design**

Sarel Jacobus Gronum

Bachelor of Commerce (Honours), Higher Diploma in Education (HDE), Graduate Diploma in  
Research Methods (GDipResMeth)

*A thesis submitted for the degree of Doctor of Philosophy at*

*The University of Queensland in 2015*

The University of Queensland Business School

## ABSTRACT

Because small and medium-sized enterprises (SMEs) are pivotal to the health and vibrancy of economies, it is crucial for researchers to understand the factors that significantly underlie SME performance. Two of the most widely identified antecedents to SME performance are innovation and networking. However, despite widespread attention, the theoretical and empirical status of the relationships between innovation, networks and SME performance remain uncertain. Some researchers note that claims regarding a direct positive relationship between innovation and networks with performance fail to adequately account for the variables that mediate this relationship.

In contrast, while much research has been undertaken into the performance benefits of innovation and networks, the exponential increase in the number of publications heralding the performance benefits of business model design and business model innovation received very scant empirical support, almost non-existent for SMEs. Business model design is seen as a powerful mechanism for unlocking and enhancing the value of business processes, including innovation. Empirical evidence presented in this thesis tangibly supports this assertion and thus creates a more solid foundation for future development of the business model view of the firm.

The purpose of this thesis, comprising four studies, is to theorise and research the nature of the relationship between innovation breadth, networks and business model design with SME performance. The central research question of this thesis asks:

*How do innovation breadth, networks and business model design relate to SME performance?*

Study One systematically reviews a large sample of SME growth and performance literature to identify and interpret emergent concepts, themes, trends and gaps. Study One backgrounds the three empirical studies that follow to argue, using Resource-Based Theory, that the resources required for developing competitive advantage are both physical and intangible; of the two, intangible resources have the greatest strategic potential. In other words, the thesis finds that SMEs lacking physical resources could develop more sustainable competitive advantage by relying more heavily on leveraging path dependent, socially complex, and causally ambiguous intangible resources. Social capital and technological competence, associated with networks and innovation, represent highly desired intangible resources. Business model design organises these resources to create value for the customer. Therefore, innovation across the elements of the business model when designing or reconfiguring the SME's business model acts as dynamic capabilities that enhance SME performance.

The systematic literature review is followed by three empirical studies that use longitudinal and cross-sectional datasets of Australian SMEs. Study Two introduces the concept of innovation breadth, as the number of distinct types of innovation that firms use, or their innovation diversity, and examines the linearity and temporality of its relationship with SME performance. This examination both confirms it to be positive and provides evidence of the diminishing and negative returns of innovation breadth. Such diminishing and negative returns are directly related to increased innovation breadth and the time lag between innovation implementation and performance measurement.

Studies Three and Four examine the mediation effect of innovation breadth on the relationship between networks and SME performance (Study Three) as well as the mediation effect of business model design themes on the relationship between innovation breadth and SME performance (Study Four). The combined findings from the last three studies provide sound support that maintaining strong heterogeneous network ties will improve SME performance, but only when the social capital embedded in such network relationships supports innovation breadth. In addition, persistent implementation of moderate levels of innovation breadth would optimise SME performance, but the performance benefits of such innovations would only be unlocked if it is implemented within a coherent business model, designed around the novelty or transaction efficiency themes as primary value drivers.

Collectively, the four empirical studies contribute to the SME innovation field by more precisely explaining the relationships between innovation breadth, networks, business model design and SME performance. This thesis therefore highlights and confirms the importance of intangible assets for SME performance and also accounts for the intermediate processes that translate these resources into SME performance by showing that innovation breadth and business model design act as dynamic capabilities. SMEs are advised to focus on building network relations that foster innovation breadth, to focus their innovation activities during any given year by limiting innovation diversity and to focus the design of their business models around either the novelty or efficiency value themes. Such knowledge offers guidance for SME managers who believe that all networking and innovation investments will improve their SME performance. Given the potential costs and risks of networking, innovation and business model design activities to SMEs, practitioners and policymakers are informed about the potential dangers of overextending limited resources and capabilities. A better understanding of how wide SMEs should cast their innovation net, how to construct optimal network structures, and how to design business models along dominant value themes may therefore greatly benefit theory, policy and practice.

## **Declaration by Author**

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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## **Publications during candidature**

### **Journal publications:**

- Gronum, S., Verreynne, M., & Kastle, T. (2012). The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. *Journal of Small Business Management*, 50(2), 257-282. doi:10.1111/j.1540-627X.2012.00353.x (77 citations as per Google Scholar on 7 May 2015).
- Gronum, S., Steen, J. T., & Verreynne, M. L. (In press). Business model design and innovation: unlocking the performance benefits of innovation. *Australian Journal of Management*.

### **Conference papers:**

- Gronum, S., & Verreynne, M. L. (2011). Convergence in the theory of small firm performance? A meta analysis. In *14th Asia-Pacific Researchers in Organization Studies Conference (APROS 2011)*. Auckland University of Technology.
- Gronum, S., & Verreynne, M. L. (2011). How much innovation is enough? The case of Australian small firms. In *8th AGSE International Research Exchange* (pp. 511-525). Swinburne University of Technology.
- Gronum, S., & Verreynne, M. L. (2011). Open innovation in Australian small firms: When should we collaborate?. In *8th AGSE International Entrepreneurship Research Exchange* (pp. 1079-1091). Swinburne University of Technology.
- Gronum, S., & Verreynne, M. L. (2012). Exploring the diminishing returns of innovation breadth on small firm performance: mediating and moderating mechanisms. In *SMS 32nd Annual International Conference*.
- Gronum, S., & Verreynne, M. L. (2013). Not just networks and open innovation: the role of innovation breadth in unlocking SME performance. In *30th Anniversary Pan-Pacific Conference*. Pan-Pacific Business Association.

### **Research vignettes – Online publications:**

- Verreynne, M. L., & Gronum, S. (2012). ACE research vignette 011: how much innovation is enough? Accessed from, <http://eprints.qut.edu.au/50066/>
- Verreynne, M. L., Gronum, S., & Kastle, T. (2012). ACE research vignette 014: how does networking contribute to the bottom line?-The value of purpose-driven networking. Accessed from, <http://eprints.qut.edu.au/50070/>

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Gronum, S., Verreyne, M., & Kastle, T. (2012). The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. *Journal of Small Business Management*, 50(2), 257-282. doi:10.1111/j.1540-627X.2012.00353.x – Fully incorporated as Chapter Four.

<b>Contributor</b>	<b>Statement of contribution</b>
Gronum, S. J. (Candidate)	Data Analysis and Interpretation (80%) Wrote the paper (80%)
Verreyne, M. L.	Support statistical analysis of data (20%) Wrote and edited paper (10%)
Kastelle, T.	Wrote and edited paper (10%)

Gronum, S., Steen, J. T., & Verreyne, M. L. (In press). Business model design and innovation: unlocking the performance benefits of innovation. *Australian Journal of Management*.

<b>Contributor</b>	<b>Statement of contribution</b>
Gronum, S. J. (Candidate)	Data Analysis and Interpretation (80%) Wrote and edited paper (80%)
Steen, J. T.	Wrote and edited paper (10%)
Verreyne, M. L.	Support statistical analysis of data (20%) Wrote and edited paper (10%)

### **Contributions by others to the thesis**

This thesis was revised based on advice and comments from my advisers Associate Professor Martie-Louise Verreyne and Doctor Tim Kastle, my readers Associate Professors Damian Hine and John Steen, as well as anonymous journal reviewers of Studies Three and Four. The final version of the thesis was copy edited by a professional editor.

### **Statement of parts of the thesis submitted to qualify for the award of another degree**

None.

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*Soli Deo Gloria.*

Brisbane, August 2015

Sarel Gronum

## **Keywords**

SME performance, innovation, networks, social capital, business model, business model design

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ANZSRC code: 150307, Innovation and Technology Management, 30%

ANZSRC code: 150314, Small Business Management, 40%

## **Fields of Research (FoR) Classification**

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## **Dedication**

This thesis is first dedicated to my sons, Wouter and Andre Gronum. As this thesis developed, you have grown from boys into young men of whom I'm extremely proud. You have been my greatest inspiration and I thank you for your support, love and many sacrifices made.

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## **LIST OF ABBREVIATIONS USED IN THE THESIS**

Australian Bureau of Statistics (ABS)

Australian and New Zealand Standard Industrial Classification (ANZSIC)

Business Activity Statements (BAS)

Business Longitudinal Data (BLD)

Business Model (BM)

Confidentialised Unit Record File (CURF)

Resource-Based Theory (RBT)

Small and Medium-sized Enterprises (SMEs)

Organisation for Economic Cooperation and Development (OECD)

# 1. INTRODUCTION

## 1.1 Background

Small and medium-sized enterprises (SMEs), here defined as firms employing fewer than 200 employees (Australian Bureau of Statistics [ABS], 2011), contribute 46 per cent of Australia's gross domestic product (ABS, 2010). As at June 2013, SMEs represented 99.83 per cent of all trading businesses in Australia and 99.56 per cent of employing businesses (ABS, 2014). SMEs are responsible for 57 per cent of the Australian private sector industry value added (wages and salaries plus profits) and 70 per cent of private sector employment (ABS, 2013; Clark, Eaton, Meek, Pye & Tuhin, 2012). The importance of SMEs to Australian and global economic development, employment as well as wealth creation is well established (Birch, 1989; Organisation for Economic Co-operation and Development [OECD], 2002). SMEs' central role in the global economy necessitates broadening and deepening our understanding of the mechanisms underlying SME performance. Such knowledge will be valuable in supporting sustainability and growth among SMEs.

Firm growth and performance are today central topics in entrepreneurship and strategy journals (McKelvie & Wiklund, 2010; Rumelt, Schendel & Teece, 1994; Short, McKelvie, Ketchen & Chandler, 2009). Notwithstanding the economic importance of SMEs and a growing body of empirical evidence, little consensus exists on the main drivers and underlying processes of firm growth and performance (Audretsch, Coad & Segarra, 2014). When compared to large firms, SMEs have material disadvantages and are hampered by liabilities of smallness (Hannan & Freeman, 1983) and newness (Stinchcombe, 1965). However, their nimbleness provides them with behavioural advantages in their quest to survive and prosper in primarily targeting niches within the markets they occupy (Nooteboom, 1993). SMEs are therefore not scaled down versions of large firms (Coad, 2009) and require investigation as unique study objects or a subset of firms within the business landscape. Most of the theories of the firm and firm performance do not clearly differentiate between firms of different sizes and therefore do not provide specific guidance for SMEs. Resource-based theory (RBT) postulates that firm performance heterogeneity stems from differences in firms' ability to obtain, build and use strategic resources and capabilities to create sustainable competitive advantage. Accordingly, the resource endowment of firms comprises unique bundles of both tangible and intangible resources of which intangible resources are deemed strategically more valuable to firms in developing sustainable competitive advantage as they are less imitable (Barney, 1991). The growing body of empirical literature on SME performance,

although highly fragmented, provides some evidence on the types of resources and capabilities that holds most potential for SMEs.

This thesis therefore first sets out to identify the most prominent themes and gaps in the extant SME growth and performance literature. The present thesis comprises a compilation of four interconnected studies. Results from a systematic literature review (Study One) confirms that compared to large firms, SMEs possess less physical resources (e.g. property, equipment and capital) to build scale and scope advantages and therefore suggests that SMEs are more reliant on intangible resources, having “disproportionately higher strategic value” (Anderson & Eshima, 2013, p. 416). Albeit the acknowledgement that intangible resources hold most potential for sustaining and enhancing SME performance, the nature of such intangible resources are still debated. The literature review identified social capital embedded in network relations (Hitt, Ireland, Camp & Sexton, 2001) and technological competence (Lee, 2010) and innovativeness (Cho & Pucik, 2005) manifested in innovation output as prominent intangible resources or capabilities. This thesis therefore investigates innovation (Liao & Rice, 2010) (in Study Two) and networks (Watson, 2007; Wynarczyk & Watson, 2005) (in Study Three), asserted by academia to have positive relationships with SME performance.

In investigating these relationships, this thesis acknowledges the criticism directed at RBT for not adequately explaining the mechanisms or business processes required to manage and exploit such intangible resources in creating sustainable competitive advantage (Kraaijenbrink, Spender & Groen, 2010). To address this gap the dynamic capability and evolutionary economic theories extend and build on RBT to emphasise that it is not mere possession of resources that are important, but that the actual value of resources lies in the firm’s ability to ‘use’ them. Firms therefore develop dynamic capabilities as “tools that manipulate resource configurations” (Eisenhardt & Martin, 2000:1118) and such adaptive changes to firm behavioural patterns account for the performance differences among firms in the economy (Nelson & Winter, 1982). The extant literature is not clear on the nature of the links between innovation, networking and SME performance. This thesis therefore provides clarity on these mechanisms that unlock or translate the performance benefits of networks and innovation in showing that networks only impact performance through stimulating innovation breadth. Innovation breadth, as a measure of innovation diversity across the business functions (or innovation within the business model), is a novel contribution of this thesis to research methodology and theory in that innovation breadth accounts for the risks associated with SME innovation diversity. This thesis shows (in Study Two) that SMEs with limited resource endowment, administrative capacity and strategic options are exposed to proportionally higher risk when attempting to simultaneously innovate more broadly.

The literature review (in Study One) also suggests that innovation enhances firm performance if it creates value for the SME's market. This finding directly relates to the emergent business model perspective, suggesting that the business model exploits innovations and describes how the firm creates value for its customers and how it shares in that value (Teece, 2010). The business model concept has attracted increased scholarly attention during the last decade but remains primarily at the level of conceptual development and has seen limited progression to application in empirical research designs. This is evident from the absence of any empirical evidence of the potential impact of business model design on SME performance in the literature (in Study One) and as such, represents a gap in our understanding that this thesis addresses. This thesis therefore provides valuable empirical evidence (in Study Four) for the positive relationship of business model design themes with SME performance. In addition, this thesis also provides evidence that a coherently designed business model acts as a mechanism that translates the performance benefits of innovation breadth.

The main research question of the thesis is:

***How do innovation breadth, networks and business model design relate to SME performance?***

Before providing an outline of the four studies contained in this thesis, it would be prudent firstly to provide justification for viewing SMEs as a unique subset of firms within the business landscape, that is different from large firms, and secondly to define how SMEs and the key constructs of 'innovation breadth' and 'performance' are used throughout this thesis.

## **1.2 Differentiating between SMEs and Large Firms**

The exact shape of firm size distribution within the economy is still debated, with some consensus maintaining the Pareto distribution to be a good approximation (Growiec, Pammolli, Riccaboni & Stanley, 2008; Luttmer, 2010). In essence this implies that few large firms coexist with a large number of small firms (Segarra & Teruel, 2012). The mere fact that small firms dominate the business landscape by sheer gravity of numbers is, however, not the only reason that led to a surge in research focusing exclusively on SMEs. The reasons for differentiating between SMEs and large firms are summarised by investigating the theoretical and empirical reasons for both growth and performance differences.

### **1.2.1 Growth as a structural determinant**

The main justification for viewing SMEs as unique study object stems from the realisation that SMEs are not scaled down versions of large firms (Coad, 2009). It is evident that organisations do not maintain their structures as they grow. Hannan and Freedman (1977) use the analogy of a mouse growing to the size of a house. As the mouse grows it requires major structural adaptation to maintain its overall structural integrity. Therefore the mouse cannot “maintain the same proportion of weight to skeletal structure as it grows” (Hannan & Freedman, 1977, p. 938). Such structural differences are also evident in the dominant capital structures adopted by SMEs, where agency costs impede access to long-term debt and equity capital, making them more reliant on internally generated funding. In line with transaction cost economic thinking “the governance cost disabilities of internal organisation” determines the limit to firm growth (Williamson, 1985, p. 131). It could therefore be argued that as firms grow, organisation, co-ordination and communication problems arise due to managerial limits on control and direction, which necessitate structural change (Greiner, 1998; Robinson, 1931). This is closely related to Penrose’s (1959) argument that administrative efficiency, coupled with learning, cognition and co-ordination abilities, ultimately determines growth potential. Growth is therefore an important structural determinant, giving rise to treating business entities of different sizes as non-homogeneous.

### **1.2.2 Material disadvantages and behavioural advantages for SME growth and performance**

Firm size has long been considered as one of the most important contingency variables in firm growth and performance studies. Numerous researchers have argued the benefits and drawbacks of different firm sizes (Audretsch & Thurik, 2001; Bain, 1968; Bracker, Keats & Pearson, 1988; Chen & Hambrick, 1995; Coad, 2007; Ketchen, Ireland & Snow, 2007; Nooteboom, 1993, 1994; Verdú-Jover, Lloréns-Montes & García-Morales, 2006; Verreyne, Meyer & Liesch, in press). Larger firms tend to possess more resource slack; greater experience and specialization, higher market share and brand recognition; greater economies of scale and scope, translating to efficiency, lower costs and higher net income growth. Large firms are however structurally more complex leading to higher bureaucracy and slower information-processing systems. In contrast, SMEs exhibit higher flexibility in organisational structure; faster decision-making and responsiveness to their external environment; more entrepreneurial drive, motivation, risk-seeking behaviour and perseverance; proximity of management to customers and the shop floor; greater ability to respond to qualitative market demand changes; flexible production technologies; flexible specialisation; as well as greater ability to absorb demand fluctuations. The disadvantages associated with small size are referred to as the “liability of smallness” and is primarily associated with resource constraints and problems of

legitimacy (Aldrich & Auster, 1986; Hannan & Freeman, 1983, p. 692). Small firms therefore have financial and human resource disadvantages (Vermeulen, 2005) but behavioural advantages (Nooteboom, 1993).

With the advent of the knowledge-based economy the importance of scale economies is decreasing, which makes small firms more competitive as they are more flexible and poses more knowledge-based assets (van Stel, Millan & Roman, 2014). This also relates to the argument made by RBT, stating that sustained competitive advantage results from bundles of both physical and intangible resources (Barney, 1991). Although SMEs are at a disadvantage when it comes to physical resources, they may possess intangible resources that have been found to have the greatest strategic potential in developing sustained competitive advantages (Ray, Barney & Muhanna, 2004). Physical resource strapped SMEs would rely more heavily on the acquisition, development and exploitation or leveraging of their intangible resources otherwise they would be forced to compete directly with more efficient large firms on price, negatively affecting their performance prospects.

### **1.2.3 Defying Gibrat's law: Industry minimum efficient scale and growth as prerequisite for survival**

The relative growth rate exhibited by firms has also been shown to be an important differentiating factor between large and small firms as illustrated by the findings that Gibrat's (1931) law does not hold for young small firms. Gibrat's (1931) law of proportional effect is accredited with applying the random growth hypothesis in explaining increased industrial concentration. It holds that if growth rates are random the firm size distribution within an industry will be skewed and the degree of skewness will increase over time. Such a highly skewed upper tail would imply that fewer very large firms would coexist with a much larger and growing number of smaller firms. To test the random growth hypothesis, scholars examined the validity of the argument that firm size has no predictive relationship with future growth as Gibrat's law states that growth rate is independent of firm size. A general consensus in the results indicates that the random growth hypothesis does not hold for small firms in that on average they consistently tend to grow faster than larger firms (Axtell, 2001; Calvo, 2006; Coad, 2009; Contini & Ravelli, 1989; de Wit, 2005; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Geroski, 1995; Hart & Oulton, 1996; Luttmer, 2010; Petrunia, 2008; Sutton, 1997).

Simon and Bonini (1958) provided one of the earliest explanations for this anomaly in postulating that the law of proportional effect only holds for firms in an industry operating above a minimum efficient scale. Accordingly, small firms operating below the industry minimum efficient

scale would have to grow rapidly to ensure long-term survival. This is confirmed by recent research that indicates that growth and survival for small firms go hand in hand as growth seems to mitigate the relative cost disadvantages experienced by small firms (Coad, Frankish, Roberts & Storey, 2013; Wiklund, 2007). In addition, Audretsch, Klomp, Santarelli, and Thurik (2004) highlight the “small-firm survival disadvantage” that exists due to specific industry characteristics including “the relative importance of sunk costs, industry growth, scale economies, and capital intensity” (p. 306). They argue that these characteristics differ substantially between manufacturing and service industries where small firms are very likely to operate at the minimum efficient scale. Subsequently, in sharp contrast to manufacturing, they found evidence that Gibrat’s law does hold for service industries (Dutch hospitality industry) characterised by less sunk costs and scale economies. In such industries it seems that small firms are not pressured to exhibit rapid growth to ensure viability. This seems to underscore the importance of industry selection, especially for SMEs, as impacting on firm performance advocated by the industrial organisation view.

#### **1.2.4 Higher growth rate variance among SMEs: Age and growth ambition**

Although growth enhances the survival prospects of small firms (Phillips & Kirchoff, 1989) and small firms seems to grow faster than large firms on average, it is important to note that over time, the average small firm growth rate variance is higher than that of larger firms (Coad, 2007). Rapid growth is therefore more erratic and less likely to be sustained in small firms (Coad, 2007). On average, small firms experiencing high growth in one year are more likely to experience little growth in the next year when compared to larger firms that exhibit less variance. One explanation for this higher variance directly relates to the previous point on the relationship between growth and survival in that firm age impact the link between size and growth. For example, smaller start-up firms, younger than five years, experience on average much higher growth than older small firms (Lawless, 2014).

The combination of higher mortality and start-up rates among SMEs imply that on average SMEs are younger than their larger counterparts, making them susceptible to suffer what has been coined “the liability of newness” (Stinchcombe, 1965, p. 148). The liability of newness (Su, Xie and Li, 2011) attribute to three factors: First, it is well established that young SMEs tend to have limited resources (Hitt et al., 2001), impairing their ability to exploit opportunities for growth. Second, legitimacy (“a social judgment of acceptance, appropriateness, and desirability”) (Zimmerman & Zeitz, 2002, p. 414) and network ties are developed over time, implying that new firms lack both of these resources, which in turn inhibit their access to other resources needed to survive and grow (Delmar & Shane, 2004; Hite & Hesterly, 2001). Last, new firms lack formalised roles and routines,



which provides them with the initial flexibility to exploit opportunities, especially in changing or evolving industries.

However, this lack of structure later results in ambiguity and uncertainty, impeding firm performance (Sine, Mitsuhashi & Kirsch, 2006). Sine et al. (2006) argue that it is of vital importance for new firms with limited resources to embrace basic structural features in creating more formalised organisational roles. They reference Perrow (1986) as stating that: “Formalized organizational roles reduce work ambiguity, enable individual focus, learning, and decision making, decrease the cost of coordination, and increase efficiency” (Sine et al., 2006, p. 122). New small firms therefore differ substantially from their larger more established counterparts in that they lack resources, legitimacies and social ties as well as role formalisation. Research also indicates that a disproportionate share of the turbulence or high growth variance among small firms is caused by a few entrepreneurial SMEs experiencing rapid extreme growth (known as gazelles) (Birch & Medoff, 1994). The majority of SMEs (also known as subsistence and or lifestyle ventures) (Morris, Schindehutte & Allen, 2005) do not grow much in real terms, that is, when controlling for inflation (Wiklund & Shepherd, 2003a). The higher growth variance among SMEs can therefore be explained from the positive relationship found between growth ambition and actual growth (Delmar & Wiklund, 2008). This finding is in line with the behavioural theory of the firm, which argues that growth is directly linked with the aspirational level for firm size (Greve, 2008). It seems that the majority of small firms do not grow because they consciously do not want to evolve into larger business organisations as this would mean suffering the negative consequences of loss of control and bureaucracy associated with increasing employee numbers. Due to the “governance cost disabilities of internal organisation” (Williamson, 1985, p. 131) or the “decreasing returns to the entrepreneur function” there is a limit to growth with some entrepreneurs choosing to remain independent SME owners rather than becoming managers in large organisations (Coase, 1988, p. 43).

### **1.2.5 Niche markets**

Lower growth ambition may also stem from small firms’ propensity to predominantly serve niche markets or “interstices” in an effort to insulate them from competing with larger firms who do not regard these smaller niches as economically viable (Penrose, 1959, p. 222). Product differentiation based on quality, design, customer service or location provides SMEs an opportunity to create “small individual market shares” in oligopolistic markets (Bain, 1968, p. 231). Chandler (1990) also held that SMEs have better growth prospects in labour intensive industries or when they are able to provide niches with specialised offerings not served by mass producers. Large firms cannot exploit

all opportunities in growth markets that present niche opportunities to SMEs (Caloghirou, Protopogerou, Spanos & Papagiannakis, 2004; Penrose, 1959). The size of these niches relative to the overall market as well as the specialised nature of the differentiated service or product coupled with the structure and resources required to deliver it may therefore require the SME to remain relative small and hence may impede the growth prospects of the SME.

To summarise, a compelling case has been presented why large and small firms should be treated as distinct research objects. The main arguments stem from the structural and behavioural differences as highlighted in the theories examined as well as the empirical studies on firm growth and performance. This thesis focuses exclusively on SMEs in uncovering the dominant themes and constructs manifest in the academic literature on SME growth and performance. The next section provides a brief introduction and definitions of the main constructs used in the present thesis.

### **1.3 Definitions**

Before providing an overview of the studies encapsulated in the present thesis, it is prudent to provide clarity for the reader by framing the study object (SMEs) as well as the main dependent and independent variables as used throughout this thesis.

#### **1.3.1 Small and medium-sized enterprises**

SMEs, as the primary study object of this thesis, are operationalised as actively trading firms in the Australian economy employing fewer than 200 employees. Actively trading firms are registered for an Australian business number, which submits business activity statements annually and remit goods and services tax. An Australian business number is a unique number that identifies a trading firm to the public via the Australian business register and assists in dealing with government departments and agencies. The business activity statement is a form submitted to the Australian taxation office by all firms to report their taxation obligations. Restrictions imposed on the samples used in Studies Two and Three of the present thesis were as per the Australian Bureau of Statistics' Technical Manual for the Business Longitudinal Database (BLD) (ABS, 2011). In addition to these restrictions non-employing SMEs were also excluded. Study Four's SME sample is similar in nature except that some industrial sectors that are excluded from the BLD, were included: electricity, gas and water supply; finance and insurance; education and training; and health and community services. Whereas the BLD covers the full frame of Australian SMEs, Study Four's sample only includes firms operating within the greater Brisbane metropolitan area in Queensland,

Australia. Australian SMEs therefore represents the main study subject of Studies Two, Three and Four of the present thesis.

### **1.3.2 SME performance**

SME performance is the main dependent variable in all of the studies comprising this thesis. SME performance in this thesis is an aggregate construct that reflects multiple self-reported measures of firm performance (Richard, Devinney, Yip & Johnson, 2009). It is conceptualised in the strategy literature tradition, and similar measures are widely applied in empirical studies with large samples of SMEs (Brockman, Jones & Becherer, 2012; Li, Veliyath & Tan, 2013; Verreynne et al., in press). This measure is adopted in an attempt to overcome construct validity problems experienced with single measurements. It also provides an appropriate measure for capturing most dimensions of the multidimensional dependent variables researched in this thesis. Studies Two and Three use a composite index measuring both SME growth or effectiveness (product and sales growth) as well as SME performance or efficiency (productivity and profitability) (Caloghirou et al., 2004; Mansury & Love, 2008; Subramanian & Nilakanta, 1996). Study Four adopts a weighted average performance index that combines 11 financial (importance and satisfaction) measures related to customer satisfaction, market share, growth and profit. A more detailed discussion of SME growth and performance as operationalised in SME growth and performance literature is provided for in Sections 2.8 and 2.9.

### **1.3.3 Innovation breadth**

Innovation breadth is a novel proxy for testing diversity of innovation output and in itself represents a contribution to theory and methodology in the field. Innovation breadth refers to the implementation of different types of innovation across a range of business functions measured by a number of variables across four categories: goods and services, operational processes, organisational or managerial processes and marketing methods. With the exception of Love, Roper and Bryson (2011) who used a similar proxy as dependent variable (coined, innovation diversity), the author is unaware of any empirical research that use this construct as applied in this thesis. Innovation breadth is also a proxy for innovation within the business model of the firm as will be elaborated in Study Four. The background to and theoretical foundation of the innovation breadth construct is discussed in Sub-sections 3.1.1 and 3.1.2. A breakdown of the thesis structure is presented next.

#### **1.4 Overview of Studies, Research Questions and Main Contributions**

The foregoing provide justification for differentiating between SMEs and large firms as well as defining the main constructs used in four studies that focus on SME performance, comprising this thesis. The thesis commences with a systematic literature review of the empirical research on SME growth and performance (Newbert, 2007) presented in Study One. This introductory study probes the dominant paradigms, the operationalisation of SME growth and performance measures, as well as the internal and external antecedents, moderators and mediators impacting SME growth and performance. Coming to an understanding of the state of SME growth and performance research demands tolerance of high levels of ambiguity. The varied nature of the empirical research stems from the adoption of different perspectives, consideration of a range of different antecedents and differential operationalisation of dependent and independent variables. For these reasons a systematic literature review, supported by electronic text or content analysis, was used rather than traditional meta-analysis. Study One's main research question is: What are the emergent concepts, themes, trends and gaps in the SME growth and performance literature? The study concludes by highlighting networking and innovation as two central and recurring themes within the SME growth and performance literature, both of which are associated with highly valuable intangible resources. The business model construct has rapidly moved from a practitioner idea (Zott, Amit & Massa, 2011) to a research agenda (Aspara, Heitanen & Tikkanen, 2010; Lambert & Davidson, 2013). As such, the business model construct was expected to be represented in the reviewed SME growth and performance literature, but this was not the case. Despite growing acknowledgement of the importance of business model design and innovation for firm performance, empirical evidence to substantiate such claims seems to be scant, especially for SMEs. As such innovation, networks and business models receive attention in the subsequent empirical studies comprising the present thesis.

Studies Two and Three use quantitative analysis obtained from the Business Longitudinal Survey data supplied by the Australian Bureau of Statistics. This dataset comprises two data panels. Panel One represents a sample selected from a survey frame containing 1 563 857 Australian SMEs created in June 2005 and includes 2 732 SMEs. This sample contains five reference periods of data (2004-05, 2005-06, 2006-07, 2007-08 and 2008-09). Panel Two represents a sample selected from a survey frame containing 1 336 515 Australian SMEs created in June 2006 and includes 3 432 SMEs. This sample also contains five reference periods of data (2005-06, 2006-07, 2007-08, 2008-09 and 2009-10). Panel One is used in Study Three and Panel Two in Study Two.

Study Two adopts RBT with its extension, the dynamic capabilities perspective (Barney, 1991; Penrose, 1959; Teece, 1984; Teece, Pisano & Shuen, 1997; Wernerfelt, 1984), as well as evolutionary growth theory (Nelson & Winter, 1982a, 1982b) to investigate the longitudinal

relationship between innovation breadth and SME performance as well as potential contextual moderators impacting this relationship. More specifically this study investigates the temporality and linearity of the innovation breadth – performance relationship. Findings suggest that this relationship exhibits characteristics of diminishing and negative returns associated with increased innovation breadth. Findings also suggest that resource constrained SMEs, having limited scope in changing routines, have to adopt certain postures or internal resource configurations to maximise the performance benefits derived from innovation breadth. They are therefore advised to focus their resources to persistently engage in moderate levels of innovation breadth to maximise their longer term performance. Larger SMEs with more innovation capabilities have more scope in broadening their innovation activities.

Study Three focuses on the mediating role of innovation breadth in the network – performance relationship, using a social capital lens (Burt, 1984, 1987, 1997; Coleman, 1990; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). The social capital perspective compliments RBT in which firm-specific, intangible assets such as social capital and associated tacit knowledge are regarded as highly desired resources, indispensable for innovation (Pittaway et al., 2004). Idiosyncratic tacit knowledge is difficult to aggregate and codify as it is built from accumulated experience through prolonged social processes of learning by doing and teaching. This necessitates the creation and maintenance of internal and external social ties. In line with RBT’s reasoning, social capital is therefore regarded as part of the SMEs pool of resources that contributes to its competitive advantage and superior performance (Chisholm & Nielsen, 2009). This study specifically investigates one important aspect relating to the dynamics of these relationships that remains ambiguous. The dominant view in the social capital and RBT literatures is that networks and the social capital embedded in these relationships are positively associated with innovativeness as well as SME performance (Pittaway et al., 2004; van Wijk et al., 2008). However, existing theories do not provide detailed and consistent guidance for the design and management of networks for innovation (Colombo, Laursen, Magnusson & Rossi-Lamastra, 2011). Also, empirical evidence into the relationship between social capital and SME performance is inconclusive in that “research has largely not accounted for the mediating process steps that translate social capital into organizational performance outcomes” (Maurer et al., 2011, p. 157). This study contributes a more nuanced view of this relationship and identifies innovation to be one of the key mediating process steps for resource strapped SMEs. Two main research questions are investigated. Does social capital, inherent to early network formation enhance subsequent innovation breadth and performance and does innovation breadth mediate the network – SME performance relationship? The study finds that innovation does favour the connected mind (Gronum, Verreyne & Kastle,

2012; Johnson, 2010). By implication, resource strapped SMEs should first and foremost engage in network relationships only if such relationships augment their innovation capabilities.

Study Four investigates business models as a recent theme in the strategy and entrepreneurship literatures by using a cross-sectional dataset containing a random stratified sample of 331 firms in tradable industries (industries that can plausibly trade internationally, given the right conditions, such as manufacturing, IT and mining) from the Brisbane metropolitan area in Australia. Divergent views on what business models and business model innovation constitutes as well as its relationship with strategy and other management theories are evident in the literature. Although increasing academic attention is devoted to clarifying the theoretical and conceptual boundaries of business models, very limited empirical evidence exist for its relationship with SME performance. Addressing this gap and responding to calls for more research on the ‘dynamics, mechanics and processes of business model innovation’ (George & Bock, 2011, p. 88; Johnson, Christensen & Kagerman, 2008), Study Four has as its objectives to provide empirical evidence for a relationship between innovation breadth (as proxy for innovation within business models), business model design and firm performance as well as to show how the presence of a coherent business model design theme mediates this relationship. The premise of this study is that it is possible to have innovation without business model innovation but innovation within a business model is not a sufficient condition for business model innovation in the absence of a coherent business model design theme. This study concludes by showing that while novelty and transaction efficiency focussed model designs are important to ensure that firms benefit from innovation within their business models, user simplicity may not provide similar benefits.

The thesis concludes with a summary of the findings and an exposition of the main contributions to theory and practice. These are fourfold: First, evidence is provided for the value of intangible resources for SMEs with limited physical and slack resources (Anderson & Eshima, 2013) in building sustainable competitive advantage (Newbert, 2007). Second, RBT, dynamic capabilities perspective, social capital theory and network literature are enhanced in that the findings illustrate the mechanisms of how and conditions under which networks, innovation breadth and business model design translate to competitive advantage as manifested in improved SME performance. This thesis therefore accounts for some of the intermediate business processes that translate resources and capabilities into firm performance. Innovation breadth is identified as a mechanism that translates the performance benefits of networks and business model design is recognised to unlock the performance benefits of innovation breadth.

Third, evolutionary growth theory states that SMEs as economic actors are bound by the limited range of routines they have mastered and that the development of new routines (in this case

innovation breadth and business model design) is exceedingly time consuming, costly and risky for SMEs. Similarly RBT holds that SMEs have limited administrative capacity that constrains their strategic variety. The thesis findings clearly highlight the need for SMEs to focus their network, innovation and business model design efforts in maximising performance. SMEs are advised to focus on building network ties that would stimulate innovation, to limit the breadth of their innovations implemented during any given year and to focus on novelty and efficiency business model design themes. The innovation breadth construct, that is integral to the research models of the last three studies comprising this thesis, is a novel concept and a valuable methodological contribution to innovation studies. Fourth, network and social capital theories are informed by confirming the linkage between networks, innovation breadth and SME performance within a longitudinal design, an understanding that remains limited due to the plethora of cross-sectional studies in the field (Bergenholtz & Waldstrøm, 2011; Bowen, Rostami & Steel, 2010; Lööf & Heshmati, 2006). Evolutionary economics is also enhanced in confirming that innovation advantages are temporary (Nelson & Winter, 1982a) and that SMEs should continually innovate to maintain higher performance levels.

The contribution to SME policy can be found in an improved understanding of the value of networks and business model design practices among SMEs as important economic growth agents. Policy imperatives would benefit by taking consideration of the mechanisms and circumstances of when and how networks, innovation breadth and business model design translate into performance as identified in this thesis. Practice will benefit in that SME owners would now be in a position to better apply their limited resources to maximise performance. Table 1.1 provides a summary of the relevant literatures examined, their main findings, gaps identified, how each study address these gaps as well as contributions made. Each of the four studies comprising this thesis is presented next.

**Table 1.1 Summary of Studies Comprising this Thesis: Literature Review, Gaps and Contribution**

Literature	Main Findings	Critique / Gaps	How Addressed in this Thesis	Contributions
<p><b>SME Growth and Performance (Study One)</b></p>	<p>The patterns and determinants of firm growth have recently re-emerged as a key research topic (Lee, 2010). Firm performance is now favoured over growth and arguably the most important construct in strategic management and entrepreneurship research (McKelvie &amp; Wiklund, 2010; 2009; Rumelt, et al., 1994; Short, et al., 2009)).</p>	<p>Notwithstanding the abundance of primary research evidence on SME growth and performance (Fotopoulos &amp; Giotopoulos, 2010; Macpherson &amp; Holt, 2007; Payne, Kennedy &amp; Davis, 2009; Stam, 2010), lack of consensus on what constitutes growth and performance as well as their antecedents remains a problem (Audretsch et al., 2014). This is a direct consequence of differences in theoretical perspectives and interpretations, operationalisation, contexts, modelling and analysis approaches, as well as the inherent complexity of growth and performance (Davidsson, Achtenhagen &amp; Naldi, 2006, p. 361). With few exceptions (e.g. Dobbs &amp; Hamilton, 2007) most literature reviews and meta-analyses with similar aims study firms of all sizes. Generally focusing on firm growth, these studies seldom account for the more inclusive construct of firm performance as adopted in this review.</p>	<p>While providing convergence is not the purpose of Study One, the aim of the systematic literature review is to synthesise the amassed conceptual and empirical evidence on SME growth and performance to present a balanced and unbiased summary of the findings as background to the empirical studies that follow. It highlights the divergence in empirical papers and provides an overview of the main themes and underlying concepts related to SME growth and performance. Both manual coding and electronic semantic analysis with Leximancer is used to minimise researcher bias.</p>	<p>Study One identifies and interprets emergent concepts, themes, trends and gaps in a large sample of SME growth and performance literature. Neither of the main theories adopted in the literature adequately explains the complexities of SME growth and performance in isolation. Thus there is a tendency among researchers to combine theories in designing their research models. The analysis suggests the literature to confer that path dependent, socially complex, and causally ambiguous intangible resources have the greatest strategic potential for building more sustainable competitive advantage, especially for SMEs lacking physical or tangible resources (Miller &amp; Shamsie, 1996; Thornhill &amp; Amit, 2003). Analysis revealed the prominence of innovation and networks as highly relevant concepts in the SME growth and performance literature representing highly desired intangible resources. Missing in this analysis, but gaining prominence is the business model construct with very little empirical evidence available. Business model design organises firm resources to create value for the customer. Business model design as a business process that exploits resources can itself therefore be regarded a valuable dynamic capability for SMEs. Leximancer content analysis represents a methodological contribution as a novel approach.</p>



Literature	Main Findings	Critique / Gaps	How Addressed in this Thesis	Contributions
<b>Innovation (Study Two)</b>	The existence of a positive link between innovation and performance seems almost obvious (Baldwin & Gellatly, 2003; Goudis, Skuras & Tsegenidi, 2003; Klomp & van Leeuwen, 2001; Prajogo, 2006; Roper, Hewitt-Dundas, Smallbone, North, & Vickers, 2002). Yet, empirical studies have not reached definitive conclusions about the relationship between innovation and firm performance in SMEs (Rosenbusch, Brinckmann & Bausch, 2011)	Uncertainties and contradictions exist regarding the nature and role of innovation as complex and varied phenomena (Baldwin & Gellatly, 2003; Bowen et al., 2010; Cho & Pucik, 2005). Issues such as the temporality, linearity and directionality of the innovation – performance relationship remain unclear (Geroski & Machin, 1993; Harmancioglu, Droge & Calantone, 2009; Mansury & Love, 2008). Innovation incentives for resource strapped SMEs is not clear (Ahuja, Lampert & Tandon et al., 2008; Coase, 1937; Hannan & Freeman, 1989).	The longitudinal design of Study Two partially addresses issues with causality and provides direction regarding the disputed length of payback and lags in the innovation breadth – performance relationship (Audretsch, 1995; Freel & Robson, 2004). Quadratic regression analysis tests for linearity, taking account of contextual variables.	The innovation breadth – performance relationship is found to be a mutually beneficial, reciprocal relationship. Innovation breadth is positively related with subsequent SME performance and <i>vice versa</i> . However, the innovation breadth – SME performance relationship is nonlinear (inverted-U). The performance benefits from moderate innovation breadth is evident one year after implementation, providing no evidence for extensive lagged payback cycles. Such benefits seem to be robust in that it is realised for up to three years after introduction, albeit declining. SMEs are therefore advised to continually engage in moderate levels of innovation breadth to maximise their long term performance.

Literature	Main Findings	Critique / Gaps	How Addressed in this Thesis	Contributions
	<p>Research assumes that every innovation is important. However, SMEs would prefer to use only a limited set of closely similar skills and build a specialised competence in them (Richardson, 1972).</p>	<p>Researchers have rarely considered the breadth of focus of innovations across multiple innovation domains (Love et al., 2011), hence do not take cognisance of the higher proportional risks (compared to large firms) associated with SMEs innovation diversity. Diverse proxies for measuring ‘innovation’ as multidimensional construct are observed in this field, leading to potential mismatch between conceptualisation and operationalisation of the innovation construct. This practice leads to a multitude of seemingly contradicting empirical results (Audretsch &amp; Lehmann, 2005).</p>	<p>‘Innovation breadth’ accounts for the risks associated with SMEs overextending their innovation diversity (given resource and strategic variety constraints), impacting negatively on effective management and firm performance (Geroski, Machin &amp; Van Reenen, 1993). Innovation breadth measures a specific dimension of innovation, namely the breadth or diversity of innovations across different business activities.</p>	<p>Introduction the concept of ‘innovation breadth’ makes a novel contribution to theory and methodology. Overextending innovation breadth is proven to be counterproductive. It will be more beneficial for SMEs to focus their innovation efforts rather than endeavouring to innovate across a large number of business areas. The negative effect of overextended innovation breadth on SME performance increases as the interval between innovation breadth and performance increase, providing further evidence in favour of narrower innovation breadth to maximise medium term performance (three years).</p>
	<p>Inquiry into the innovation – performance relationship of SMEs is only starting to draw attention (Rosenbusch et al., 2011).</p>	<p>Most innovation studies were conducted on large firms (Damanpour &amp; Evan, 1984; Gopalakrishnan, 2000; Kleinschmidt &amp; Cooper, 1991; Löf &amp; Heshmati, 2006; Wong, Page, Abello, &amp; Pang, 2007). SMEs are not scaled down versions of large firms (Coad, 2009).</p>	<p>The present thesis focuses solely on SMEs (employing less than 200 employees) across all industries.</p>	<p>SMEs can now make informed decisions as to what innovation strategy to adopt for optimal returns, better informing public policy responses towards SME development. Broad application of diverse innovation activities may be beneficial for large firms but seems not to be the case for SMEs.</p>

Literature	Main Findings	Critique / Gaps	How Addressed in this Thesis	Contributions
<b>Network and Social Capital (Study Three)</b>	Positive network – innovation – performance relationships.	Empirical studies on networking have mainly looked at innovation performance rather than firm performance as dependent variables (Ahuja et al., 2008).	The study design accounts for the complexity in the relationships of networking activities with both innovation and performance (Colombo, Laursen, Magnusson & Rossi-Lamastra, 2012).	Study Three confirms the positive impact of networks on both innovation breadth and SME performance. Maintaining network relationships are risky for SMEs. SMEs’ owners and managers should use their limited resources in establishing strong (and possible diverse) network links.
	The relationships between networks, innovation and firm performance is highly complex.	The manner in which networks translates into better performance is contentious (Lee, Lee & Pennings, 2001). Research has largely not accounted for the mediating process steps (Maurer, Bartsch & Ebers, 2011).	The design accounts for both dimensions of social capital; tie strength and heterogeneity, representing a more nuanced network conceptualisation as both matters for innovation breadth.	Addresses the gap in literature by clarifying the mechanism by which networks translate to performance benefits. Network links should primarily be directed at increasing innovation breadth, a mediatory mechanism that unlocks the performance value of networks.
	Most research designs are cross-sectional (Bergenholtz & Waldstrøm, 2011).	These designs do not make provision for the lagging effect of networks on innovation breadth and performance.	The study design is longitudinal solving the problem of temporality inherent to cross-sectional studies.	Temporal impact of network activities on innovation and subsequently on performance could now be established.
<b>Business Model and Business Model Innovation (Study Four)</b>	A business model describes how an organisation creates value for its customers and how it shares in that value (Teece, 2010). Innovative firms succeed when they align multiple innovations with value-creating outcomes for particular groups of customers (Spencer, 2013).	The ‘business model view’ and related ‘business model innovation’ as emerging strategy and innovation research domains remain both ill-defined and marred by ambiguous construct boundaries and limited empirical support (George & Bock, 2011; Teece, 2010). What actually constitutes business model innovation, as opposed to conventional innovation (product, process or service), is unclear.	Investigates the relationships between innovation in the business model, business model design themes, and firm performance by developing an integrated theoretical framework and empirically testing it on a sample of 331 Australian SMEs. Three business model design themes; novelty, transaction efficiency, and user simplicity (Zott & Amit, 2007).	Business model design themes are found to mediate the relationship between innovation and firm performance. The novelty centred design theme is found to unlock and translate the value from innovation to firm performance to a greater extent than transaction efficiency and user simplicity. SMEs are advised to focus their business model design efforts more narrowly on coherently entrenching novelty and efficiency within their activity and transaction architecture.

## **2. STUDY ONE: SME GROWTH AND PERFORMANCE: A SYSTEMATIC LITERATURE REVIEW AND SEMANTIC MAPPING.**

### **ABSTRACT**

Firm growth and performance are key research topics in the economic, strategy and entrepreneurship literatures. Notwithstanding the abundance of ever increasing research evidence on SME growth and performance, ambiguities and lack of consensus remain on what constitutes growth and performance as well as the antecedents thereof. Without attempting to provide convergence, this systematic literature review of 287 peer-reviewed journal articles relating to SME growth and performance applies manual coding and electronic semantic analysis to identify emergent concepts, main themes, trends and gaps. In addition, this review investigates the main theories adopted, SME growth and performance conceptualisations, measurements and antecedents. Leximancer semantic and thematic analyses are used to overcome the methodological issues that hamper application of traditional meta-analysis, without introducing researcher bias. Two dominant themes of ‘capital’ (dominated by internal firm factors) and ‘market’ (external market factors) are identified and resemble the debate on industry effects (Industrial Organisation View) versus firm-specific effects (Resource-Based Theory) as determinants of firm growth and performance variance. Manual coding identified in excess of 100 antecedents of, and more than 55 measures for growth and performance, highlighting the fragmented and diverse state of affairs within the literature. Performance studies use broader dependent variable operationalisations than growth studies to address construct validity problems with single measurements, providing merit for adopting multiple performance measures in empiric studies. Analysing the dominant concepts related to the dominant main themes, coupled with the theories on firm growth and performance led to identification of innovation, network ties and business models as potential areas for further research and set the scene for the remainder of the studies comprising this thesis.

### **2.1 Introduction and Background**

This chapter contains the introductory study to this thesis by systematically reviewing the SME growth and performance literature. This literature review is two-fold: it seeks to comprehend the extensive secondary research into SME growth and performance and to present a balanced and unbiased summary of the findings as background to the empirical studies contained in this thesis that follow (Thompson, Davis & Mazerolle, 2014).

The starting point of this analysis, and indeed the golden thread that connects the studies contained in this thesis, is SME growth and performance, the widely used dependent variables in SME studies. The patterns and determinants of firm growth have recently re-emerged as an important research topic (Lee, 2010). It builds on a large body of firm growth studies investigating the relationship between growth and the size of the firm since the introduction of Gibrat's (1931) law, which is now a central topic in entrepreneurship journals (McKelvie & Wiklund, 2010). The broader concept of firm performance is also receiving increased prominence in scholarly research. While earlier works acknowledged mainly its role as a dependent variable, firm performance is now favoured over growth to become arguably the most important construct in strategic management research (Rumelt, et al., 1994). In highly competitive global markets, SMEs seek to improve their competitive position to ensure survival by implementing strategies that enhance business performance. Firm strategy therefore concerns itself primarily with the theory of business performance. To excel implies superior performance relative to competitors, and is achieved by mobilising and adapting resources in a respective competitive arena (Penrose, 1959).

Notwithstanding the abundance of primary research evidence on SME growth and performance (Davidsson, Kirchoff, Hatemi-J & Gustavsson, 2002; Fotopoulos & Giotopoulos, 2010; Gilbert, McDougall & Audretsch, 2006; Macpherson & Holt, 2007; Payne et al., 2009; Stam, 2010), SME owners, managers and policy makers are presented with ambiguous counsel as to the how, when and what to do to ensure on-par or above aspiration level firm performance. To meet this challenge, strategy and entrepreneurship scholars provide highly fragmented and diverse theoretical perspectives with often abstract constructs. This confused state of affairs is due to the lack of consensus as to what constitutes growth and performance as well as their antecedents (Audretsch et al., 2014). For example, Davidsson et al. (2006) highlight differences in “theoretical and epistemological perspectives and interpretations, operationalisation, empirical contexts, modelling and analysis approaches, as well as the inherent complexity of the phenomenon itself” (p. 361). This means that scholars draw from several perspectives, emphasising industry structure (Davidsson, 1991), competitive strategy (Yamakawa, Yang & Lin, 2011), firm level strategic orientations (Roper, 1998), resources (Newbert, Kirchoff & Walsh, 2007), or dimensions of environmental constraints (Wiklund & Shepherd, 2003a) with very little overall convergence. This in turn leads to “multiple academic conversations that share little in common” (Grégoire et al., 2006, p. 345). It thus seems that a shared perspective of the theory of SME growth and performance remains elusive.

While this study may not seek to remedy such a divergence, much can be learnt from systematically reviewing the literature to derive an overview of the main themes and underlying

concepts related to SME growth and performance. To successfully explain these themes and concepts, both manual coding and electronic semantic analysis with Leximancer is used on a dataset comprising 287 published journal articles. The study is organised as follows: First, the study aims, data sampling approach, and research methodology are explained. Second, the results of manual coding, indicating the prevalence of the theories of the firm used in framing the journal articles contained in the data sample is presented. Third, the electronic semantic analysis methodology is presented, followed by identifying and graphically illustrating the dominant, emergent themes and concepts by means of Leximancer concept maps and concept ranked charts. Fourth, the dependent variables (SME growth and performance) and their relationship with the independent variables, moderators and mediators are identified and interpreted. The study concludes by linking the dominant themes in the SME performance and growth literature with the theories of the firm resulting in the framing of the subsequent studies that make up this thesis.

## **2.2 Study Objectives**

This study aims to inductively identify the main themes and concepts emerging from peer-reviewed journals relating to SME growth and performance. In addition, it investigates the perceived shared genesis of these themes and concepts. More specifically, this study asks the following main and sub-questions:

***What are the inductive emergent concepts, themes, trends and gaps in the SME growth and performance literature?***

- What are the main paradigms adopted in explaining SME growth and performance?
  - What are the main premises of the theories of the firm as variously adopted in the empirical research under investigation?
  - How do these paradigms link up with the main themes identified in the semantic analysis?
- How are SME growth and performance conceptualised and measured as dependent variables?
  - What is the degree of consensus among scholars?
  - Do and should researchers differentiate between growth and performance?
  - What is considered best practice in operationalising growth and performance as dependent variables in empirical research?
- What are the antecedents (including internal elements and configurations of these variables with external dynamics) associated with SME growth and performance as purported in academic literature?

- What concepts and themes dominate the literature on SME growth and performance? Are there any contemporary themes or theories pertaining to SME growth and performance that are under-represented within the sample of empirical research, presenting potential avenues for further investigation?

The above research questions guided the data analysis by providing a focus or domain of relevance and do not constitute a list of specific *a priori* findings (Thomas, 2006). The systematic literature review approach (Newbert, 2007) used for sampling is discussed next. A two-pronged analytic approach comprising firstly manual coding of identified variables was performed in conjunction with sample selection. The second approach further supported the systematic literature review by applying electronic text analysis, the analytic software Leximancer (Version 4), as a rigorous and trustworthy qualitative research method (Smith & Humphreys, 2006).

### **2.3 Data and Sampling Approach**

Data, in the form of peer reviewed journal articles, were obtained through systematically identifying a sample of research evidence that have SME or small firm growth and/or performance as their primary focus. The sampling approach used in the present study was adopted from David and Han (2004) as well as Newbert (2007). These authors explain that, in its first steps, a systematic literature review approach attempts to minimise researcher induced selection bias that results from subjective sampling based on the researcher's unconscious predisposition. It therefore ensures that the resultant sample accurately represents the population from which it was drawn. A series of four steps were followed in applying this sampling methodology:

First, an initial search using the keywords (small firm/s, SME/s, growth, profitability, and/or performance) was performed on the following databases: SCOPUS, JSTOR, EBSCO's and ScienceDirect. The scope of the keywords used in the search was deliberately narrow to maximise relevance of the expected large volume of search results to the selection criteria applied in the second step of sampling. Selection criteria were formulated in accordance with the aims of this study to identify appropriate journal articles for inclusion in the dataset. They comprise:

- Only published papers in peer reviewed journals.
- Quantitative as well as qualitative or conceptual studies.
- Papers for which the explicitly stated main focus, theme, study objective or dependent variable related to firm growth and/or performance.

- Papers using a level of analysis at the firm level or, if a multilevel approach was adopted, studies that include firm level analysis.
- Papers in which small firms or SMEs (allowing for variance in SME classification from micro to a maximum employment level of 500 employees) were the focus.
- Papers for which industry classification of focal firms were not used as discriminator; hence all studies were to cover specific or all sectors of the economy.

Third, the selection criteria were then applied to the 372 articles identified in the database search by probing their abstracts for first-level inclusion. Fourth, 344 articles were then reviewed for final inclusion by reading the full articles. This full review also involved manual coding of the articles' texts, as discussed in the research methods in the following section. Potentially suitable, cross-referenced papers, not included in the original database search results, were also identified and subjected to full content review.

This culminated in 287 articles being included in the final sample representing 63 journals (see Table 2.1), most of which emanated from the *Journal of Small Business Management* and *Small Business Economics*. Publication dates varied from 1973 to 2013, with a greater number of them published in the last decade (59 per cent). The large amount of research in the last decade underscores the increasing prominence of the SME growth and performance debate. However, it should be noted that the analyses were based on published journal articles that are available on electronic databases and accessible via the internet. Under-representation of journal articles published prior to 1993 in the sample may therefore be caused by many of them not being converted into an electronic format and therefore being unavailable for inclusion.

Notwithstanding the reason, it is clear from the sample that research into SME growth and performance has increased exponentially. It is also interesting to note the almost equal split between the literature focussing on SME growth and that focussing on SME performance as dependent variables. As will be elaborated later, quantitative studies with performance as a dependent variable usually include some measure of growth in addition to other proxies in operationalising performance. This implies that, although growth measures are the preferred measure adopted in the studies, a slight majority of the sample studies articulate their aim as investigating SME performance rather than growth *per se*.



**Table 2.1 Sample Journal Titles, Publication Date Range and Primary Research Focus**

<b>Journal Titles</b>	<b>N</b>	<b>Percentage of Sample</b>
Journal of Small Business Management	102	36%
Small Business Economics	47	16%
Entrepreneurship Theory and Practice	22	8%
Journal of Business Venturing	19	7%
International Small Business Journal	6	2%
<b>Publication Date Range</b>		
1973 – 1983	3	1%
1984 – 1993	24	8%
1994 – 2003	92	32%
2004 – 2013	168	59%
<b>Primary Research Focus</b>		
SME growth	134	47%
SME performance	153	53%

The dataset of selected journal articles was subjected to two analytical approaches, being manual coding and electronic text analysis, as discussed next.

## **2.4 Research Methods**

Manual coding was first applied to the sample to identify a number of variables. The result was recorded on an Excel spread sheet to show the sample articles': reference details, study themes and research questions, theoretical framework/s, level/s of analysis, research target/s, pertinent findings as well as the dependent and independent variables used in quantitative studies. To minimise researcher bias, the electronic text analytics software Leximancer was used in conjunction with manual coding as the primary qualitative analysis tool (Smith & Humphreys, 2006). Because published journal articles consist of text and therefore exhibit similarities to qualitative data, this approach is more preferred to traditional meta-analysis, which is a structured analysis of a body of empirical literature on a theorised relationship (Campbell-Hunt, 2000). Two methodological issues prohibit the application of traditional meta-analysis to address the current research questions. First, the identification of themes and related configurations ascribed to SME growth and performance is problematic, as evident from this analysis, making direct comparability impossible. Across studies,

models of growth and performance are framed differently, coupled with diverse specification of underlying internal and external variable scales. Multiple theorised relationships are therefore investigated, implying little convergence in the hypotheses under investigation. Second, the accumulation and testing of multivariate patterns of association between large numbers of identified dependent variables, and operationalising SME performance at different levels, are not possible when employing traditional meta-analytics. Most meta-analytics deal with analysis of single relationship effect size and cannot deal with this situation. For the purpose of framing the subsequent studies comprising this thesis, it was necessary to look at all potential themes and relationships to determine appropriate avenues for directing further empirical analysis. This would not have been possible when applying traditional meta-analysis.

Leximancer is ideally suited for this type of content analysis because it assists its user to identify first-order concepts, second-order themes and relationships (thematic and semantic analysis) without introducing researcher bias (Cummings & Daellenbach, 2009; Verreynne, Parker & Wilson, 2013). Recent research papers reveal that Leximancer is increasingly used as a semantic mapping tool in qualitative research designs (Cretchley, Gallois, Chenery & Smith, 2010; Dann, 2010; Liesch, Håkanson, McGaughey, Middleton & Cretchley, 2011; Hansson, Carey & Kjartansson, 2010; Campbell, Pitt, Parent & Berthon, 2011; Hewett, Watson, Gallois, Ward & Leggett, 2009; Cretchley, Rooney & Gallois, 2010; Rooney et al., 2010). Such increased popularity stems from Leximancer having been validated as an appropriate knowledge discovery, qualitative research tool (Smith & Humphreys, 2006).

Leximancer employs two stages of extraction, classified by Smith and Humphreys (2006), as 'semantic extraction' and 'relational extraction' (p. 262-263). First, *semantic extraction* involves the automatic discovery and extraction of thesaurus-based words or 'concept seeds' that occur most frequently in a 'sliding text coding block' within the text data. The number of sentences to be included in the sliding text coding block is predefined by the researcher since this is the average length of text constrained by one instance of a concept. This study used four sentences per text block as opposed to the default setting of three sentences. Repeated analysis indicated that thesaurus abstraction using four sentence learning blocks provided more accurate concept seeds given the writing style used in research papers where discussions of interconnected concepts can span over larger text blocks. Articles published in journals normally have narrower sentence columns resulting in a large degree of hyphenated words. The disadvantage of this is that the automatic character recognition software may not correctly recognise words meaning that certain concepts may be under-represented. Another issue is when similar words are identified as separate concepts when, for the purpose of analysis it may not be the case (for example; risk, risks and risking). To

remedy both of these issues, Leximancer was set to automatically merge singular and plural word variants and to also ensure that similar and hyphenated words are merged into singular preliminary thesaurus concept seeds (Cretchley, Rooney & Gallois, 2010).

Further, once generated, the researcher has the option to edit the concept thesaurus by splitting automatically merged concepts as well as deleting or adding concepts to the thesaurus. No words were added to the thesaurus and similar words with different meanings that were automatically merged into singular concept seeds were manually split (e.g., entrepreneurial and entrepreneurs). Words that appeared in periodical titles were also clearly over-represented, negatively impacting upon theme identification and relational analysis, discussed in the next section. To remedy this, Leximancer identifies these ‘name-like’ (proper noun) words with an upper case first letter in the thesaurus. Deleting the capitalised concept seeds, that were identified as proper nouns upon investigating them, assisted with disambiguation (Crofts & Bisman, 2010). General terms not adding to the meaning, its interpretation and/or that are over-represented as a consequence of the research terminology used in the academic articles were also deleted. These included words such as analysis, average, data, items, measures and measurement, model, paper, percent and per cent, rate, regression, relationship, research, role/s, sample, scale, significant/significance, survey, able, test, theory, total, variables, year, and ‘et al.’. Given the large amount of data in the sample, words with a count of fewer than 100, and a relevance factor below 10 per cent, were also deleted. These words often lack semantic value pertinent to this study and thus tended to impede interpretation in that they overpopulate the concept maps, obscuring more prominent concept clusters. These words included:

oriented, invest, implicitly, times, manufacturers, internally, organised, economics, processing, financiers, inform, grouped, innovators, socialization, informants, valued, economically, customized, employers, valuing, capitalism, manageable, economizing, marketers, resourcefulness, developer, marketable, and socialism.
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The second stage of extraction, *relational extraction*, determines the lexical co-occurrence of the specified concepts to demonstrate semantic and grammatical clustering around dominant ‘themes’ (Smith & Humphreys, 2006). This process implements “naïve Bayesian accumulation of evidence” (Smith & Humphreys, 2006, p. 264) in identifying the emergent concept groups as themes. Leximancer generates a visually interpretive, two dimensional concept map of the semantic structure of the data set. Thesaurus concepts are mapped as dots, the size of which indicates occurrence frequency in the data. Concepts are positioned on the concept map showing their hierarchy of connectedness in that highly connected concepts appear close to one another. Themes

are visually represented as circles spanning the regions around closely connected clusters of concepts. Each theme is identified by the most dominant or interconnected concept within that thematic cluster.

However, because accurate semantic analysis requires a stable concept map to be generated, it is important to recognise that the presence of highly or over-connected concepts cause the visual concept map to lose differentiation and stability (Leximancer, 2011). Stability in the concept map is achieved when the underlying themes and concepts are consistently and reliably identified each time the Leximancer project is run. Over-connected concepts cause instability in the concept map in that themes are identified and represented differently each time the concept map is generated, as was the case with the first round analyses (see Figure 2.1). If the over-connected concepts resemble large mountains in the data landscape that negate the existence of smaller hills and valleys, then a consistently clear view and hence a more nuanced interpretation are impeded (Leximancer, 2011). As previously stated in the sample selection criteria of this thesis, all articles under review must contribute to the literature on SME growth and performance. Accordingly, the over-connected concepts directly associated with the overarching literature themes of SME growth and performance were iteratively removed until a stable map was consistently generated (Figure 2.2). These words include growth, performance, as well as words associated with the study object of each reviewed article: firm/s, business/es, enterprise/es, company/ies, SMEs and venture/s.

The final step in the analysis of the academic literature involved addressing the study aims by interpreting the emergent themes and concepts inductively derived using Leximancer extraction by manually reviewing the actual text underlying them (Crofts & Bisman, 2010). The results of manual coding and the Leximancer analyses are presented in the next sections, commencing with investigating the theoretical paradigms adopted.

## **2.5 Theoretical Paradigms Adopted Within SME Growth and Performance Literature**

SME growth and performance studies are littered with different theories adopted by scholars in hypothesising relationships and developing constructs. The diverse set of perspectives adopted may indicate a lack in commonality in the theories of SME growth and performance. This probably directly results from the multidisciplinary nature of SME growth and performance research. Manual coding revealed that a number of articles did not explicate their theoretical perspectives. Of those that did, the majority adopted a single research frame. However, it is interesting to note that the historical trend seems to be that scholars increasingly adopt multiple theories when designing their studies (Baum, Locke & Smith, 2001; Payne et al., 2009; Rhee, Park & Lee, 2010; Wiklund, Patzelt

& Shepherd, 2009). This may indicate that new theories are being developed or existing ones are fragmenting, to reflect and/or accommodate the diversity of firm growth and performance. New ideas and insight seem to originate from the overlap of different theories rather than applying singular ones, acknowledging the difficulty in understanding complex relationships through a single theoretical lens (Gray & Wood, 1991). The main theoretical perspectives adopted, as identified by manual coding, is summarised as follows in broad categories (without implying direct associations between the theories):

- 32 per cent adopted the resource-based theory (RBT) (Barney, 1991) as well as the more recent and extended RBT, which expands firms' boundaries to their inter-firm alliance relationships and the alignment with their external environment (Dyer & Singh, 1998; Lavie, 2006; Arya & Lin, 2007). The associated dynamic capabilities view, absorptive capacity theory, the knowledge-based view (Conner & Prahalad, 1996; Grant, 1996b; Nonaka, 1994; Spender, 1996) and the organisational learning framework were also evident.
- 16 per cent used social capital (Coleman, 1988, 1990) and social network theories.
- 14 per cent used entrepreneurship orientation and entrepreneurial strategy-making (Dess, Lumpkin & Covin, 1997), including the innovation orientation view and entrepreneurship behaviour theories.
- 13 per cent adopted a market orientation (Narver & Slater, 1990), mainly evident in marketing periodicals.
- 10 per cent adopted strategic management theory including business policy and the upper echelon theory of strategic management (Hambrick & Mason, 1984), as well as contingency and configurations theories, which focus on the fit between strategy, structure, and environmental factors (Short, Payne & Ketchen, 2008; Wiklund & Shepherd, 2005; Doty, Glick & Huber, 1993; Ketchen, Thomas & Snow, 1993).
- Economic theories occupied sixth place (9%) including the economic theory of human capital (Becker, 1964; Rosen, 1987), population ecology (e.g., Hannan & Freeman, 1977), agglomeration (e.g., Canina, Enz & Harrison, 2005), organisational ecology theories (e.g., Baum & Oliver, 1996; Romanelli, 1989), transaction cost theory, property rights theory as well as phenomenological research testing Gibrat's law (1931) in SME growth studies. Porter's geographic clusters also referred to as the industry cluster view, the industrial organisation view, new economic geography information processing theory (Mitchell, Smith, Seawright & Morse, 2000), as well as agency theory completed the list of economic theories.

Lesser applied theories originating from among others' psychology and sociology: behavioural decision theory (Payne & Bettman, 1992), psychological theories of motivation, and the theory of planned behaviour, regulatory focus theories (Brockner, Higgins & Low, 2004), information-processing theory, attribution theory, dual process theories of reasoning (Epstein, 1994; Kahneman, 2003; Sloman, 2002), role accumulation perspective, relational perspective, and feminist theory. Other theories included the technological-competence-based view, small business orientation, corporate entrepreneurship (Miller, 1983), corporate finance theory, the asset complementarity perspective, internationalization orientation (Welch & Luostarinen, 1993), the family-embeddedness perspective on entrepreneurship, and total quality management.

While the diversity in SME growth and performance studies evidently results from the corresponding diversity of theoretical perspectives adopted, this multidisciplinary richness assists SME growth and performance to be explained. It is therefore prudent to explore relevant theories of the firm. The theories adopted by researchers could be classified in one of two groups. The first group includes those theories that may be classified as theories of the firm (e.g., transaction cost theory), and theories directly related to the dependent variable, including those theories that provide an explanatory framework for firm growth and performance (e.g., RBT). The second group involves those theories explaining phenomena related to the independent variables used in growth and performance studies, which only indirectly relate to SME growth and performance (e.g., social capital theory). While it is not possible to detail all these theories as part of this study, a selection of theories is summarised in Appendix A. These theories fall under the former group of theories that are commonly regarded as foundational to strategic management. The latter group of applied or strategic posture theories, such as entrepreneurial orientation, innovation orientation and market orientation, which originated from and are addressed variously in the fundamental theories of the firm, are omitted. Appendix A illustrates if and how these theories delineate the boundaries of the firm as well as how they explain size distribution of firms in the economy, including heterogeneous firm growth and performance. The next step was to visually present the results from the Leximancer analysis highlighting the prevalence and co-occurrence of concepts and themes in the academic literature on SME growth and performance.

## **2.6 Leximancer Concept Maps: Emergent Themes and Concepts**

Leximancer identifies the main concepts in a body of qualitative data. However, it also has the capacity to quantify the relationships between these concepts and to represent this information in a two-dimensional concept map, providing a bird's eye view of the data (see Section 2.4 above)

(Leximancer, 2011). Interpretation of the concept map is derived from analysing the frequency, centrality and co-occurrence of concepts as well as emerging themes. Frequency indicates a concept's occurrence, represented by its relative size on the concept map. Concept co-occurrence within text-blocks (how often concepts appear in adjacent sentences) is illustrated by their proximity to other concepts on the map. As stated, themes represent clusters of related concepts that co-occur. The concept map is depicted as a colour coded heat-map where the theme circle colours are displayed in varying degrees of brightness or 'heat' (hottest being red and so on, according to the colour wheel) that represents a theme's relative strength. Leximancer provides an option to adjust the number of themes displayed to provide fewer but broader, or more but narrower thematic clusters in the concept map. Figure 2.1 and Figure 2.2 were both generated at 60 per cent theme size magnification.

**Figure 2.1 Leximancer Concept Map (Unstable): Including SME Growth and Performance Concepts**

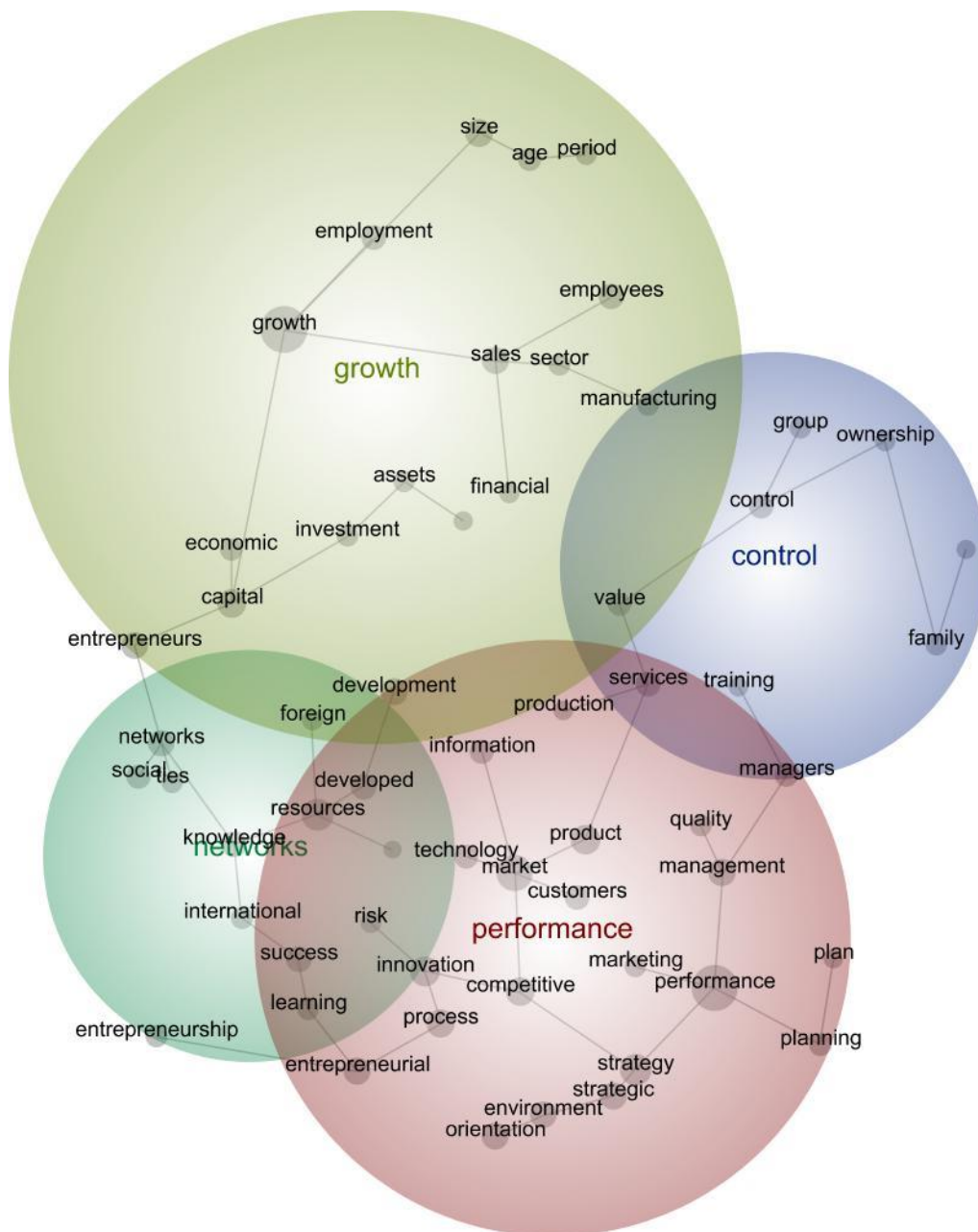


Figure 2.1 represents a concept map generated during the first round analysis. This map was unstable in that subsequent recluster runs provided inconsistent results. Nevertheless, note that the ‘performance’ theme had consistently higher connectivity percentages (an indicator of relative strength) than the ‘growth’ theme in all runs. This is also reflected in the colour ‘heat’ difference between the two themes in Figure 2.1. It is not the frequency of the concepts (word counts of 8563 for growth and 7462 for performance) ascribed to the themes that determine the strength of these themes, but rather the denser clustering of co-occurring concepts. Co-occurrence is only measured



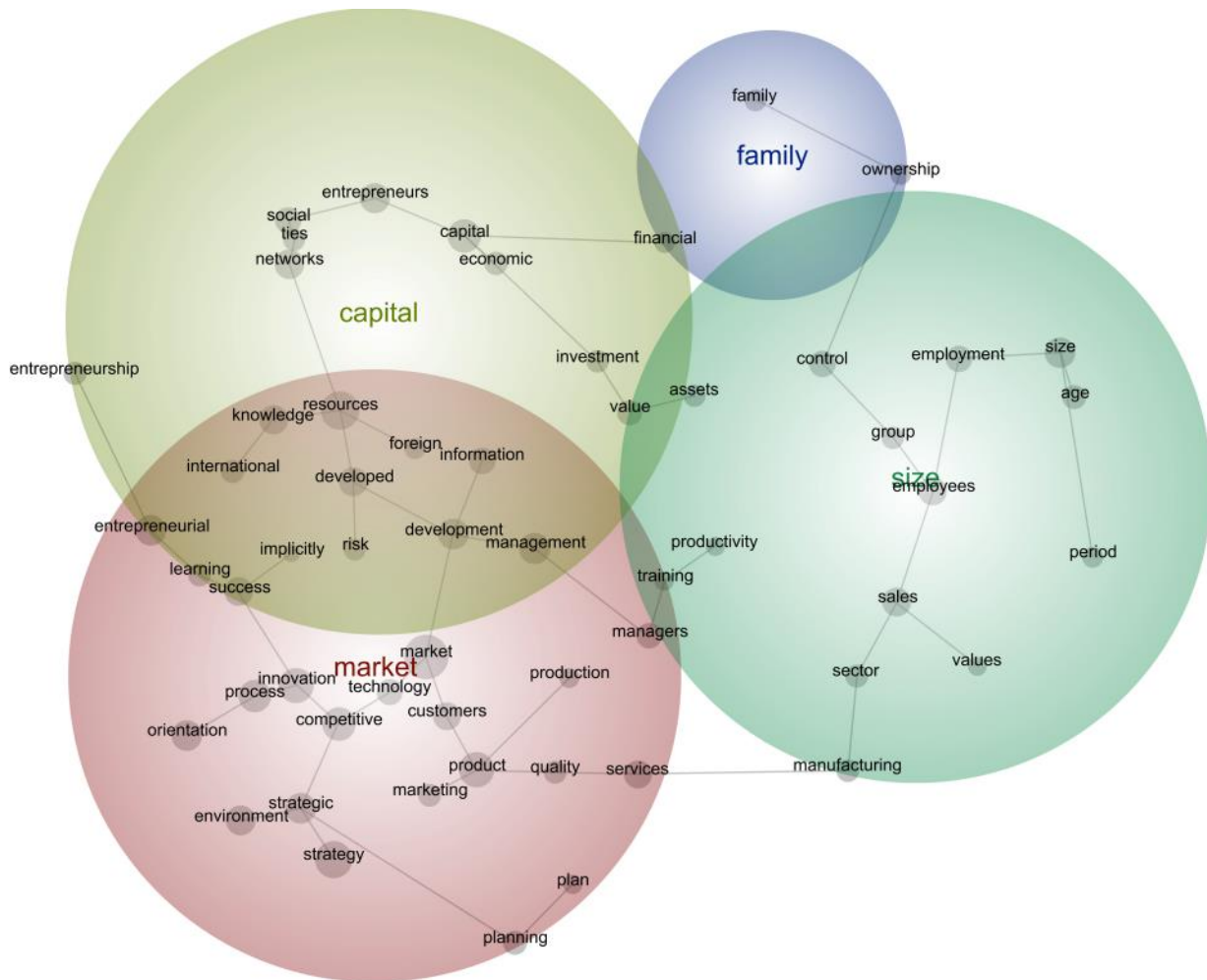
within and not across text-blocks, set at four sentences in the present study (Leximancer, 2011). The greater ranking of the performance theme, when compared to growth, which was also a search term, therefore indicates that the sample articles' authors use 'performance' more than 'growth' when writing about other concepts selected by Leximancer as frequent in the literature on SME growth and performance.

Growth in the map is closely related, as expected and discussed below, to the firm size factors of employment, sales, assets, and capital, as well as other control variables including age, industry sector and ownership. Very few explanatory variables appear within the growth theme, as opposed to the performance theme that is dominated by explanatory rather than descriptive variables normally associated with how performance is operationalised. These include planning, competitive strategy, management, innovation, resources as well as overlapping the networks theme.

This preliminary assessment seems to indicate that most studies of growth focus on explaining of growth against the backdrop of the characteristics of the firm population under review, whereas performance studies seems to go beyond description in uncovering more predictive causal relationships. As discussed in more detail below, networks have also been identified as a prominent theme in the literature.

As explained in Section 2.4 above, the over-connected concepts causing the instability in Figure 2.1 were removed resulting in a highly stable map being consistently generated as represented in Figure 2.2.

**Figure 2.2 Leximancer Concept Map (Stable): Excluding Growth and Performance Concepts**



The broad view of the SME growth and performance of the academic literature as summarised in Figure 2.2, allows useful interpretations. The consistent dominance of three themes, ‘market’, ‘capital’ and ‘size’ are striking. The connectivity percentages are 100 per cent for market, 46 per cent for capital, 40 per cent for size and only five per cent for family, as also reflected in the heat-map. Research into a narrower target population of family-owned SMEs thus caused family to be found by Leximancer but not significantly within the data sample. The size theme is dominated by descriptor and control variables used in quantitative research models whereas the market and capital themes contain more explanatory concepts associated with the SME growth and performance debate. The interpretation and discussion presented here would therefore focus attention on the two dominant emergent themes of ‘capital’ (dominated by internal firm factors) and ‘market’ (external market factors), which were identified earlier as important to firm growth and performance respectively.

This observation resembles the lively debate on industry effects of the industrial organisation view versus firm-specific effects or production (RBT) as determinants of firm growth and performance variance (Caloghirou et al., 2004; Goddard, Tavakoli & Wilson, 2009; Hansen & Wernerfelt, 1989). It seems at first glance that ‘success’ in SME growth and performance lies at the intersection of the dominant themes of ‘capital’ (social or network, managerial, entrepreneurial, knowledge, financial, resources) and ‘market’ (strategy, orientation, technology and innovation, products and services, quality, competitiveness). Further interpretation of how the theories of the firm inform the dominant themes and their associated concepts will be provided in Section 2.10. In the next sections the analysis of the literature moves from an overall view of the dominant themes to investigate the specific concepts associated with dependent and independent variables used in the empirical studies under review.

## **2.7 Dependent Variables**

The conceptualisation and/or operationalisation of the dependant variables in SME growth and performance studies are diverse and inconsistent among empirical studies. Most studies use a composite index or multiple measures for their dependent variable. They incorporate both financial measures (economic achievements) and nonfinancial operational measures (such as innovativeness or factors that may lead to financial performance) (Rauch, Wiklund, Lumpkin & Frese, 2009; Unger, Rauch, Frese & Rosenbusch, 2011; Venkatraman & Ramanujam, 1986). As expected, from the criteria applied to the selection of sample articles for this literature review, the majority of studies reviewed referred to the dependent variable/s as growth, profitability, and/or performance. The use of multiple measures, between and within studies, complicated analysis and categorisation. To illustrate this, some of these studies investigated profitability, expressed in absolute terms in a cross-sectional design, whereas other studies investigated profitability growth in a longitudinal (or time lagged) design and, to complicate matters even more, some studies used both measures in the same study. Many of the studies therefore did not differentiate between growth and performance as they perceived performance to also include growth. This meant that determining the exact proportional prevalence of performance as opposed to growth measures was not possible. To provide an accurate indication of the relative importance attached by the authors to the different conceptualisations, each dependent variable was grouped under the headings of financial and nonfinancial measures (Rauch et al., 2009). More than 55 variables were used in the sample papers to operationalise growth and performance with performance operationalisations being most diverse.

For this reason, only the most prevalent proxies with a relative frequency of occurrence within the full sample of more than three per cent are presented in Table 2.2.

**Table 2.2 SME Growth and Performance Proxies**

<b>Dependent Variables: (Omitted results with equal to or less than 3% prevalence)</b>	<b>Prevalence %</b>	<b>Overall Rank</b>
<b>Non-financial Growth and/or Performance Measures:</b>	<b>36</b>	<b>II</b>
<i>Satisfaction with (Relative to expectations, past performance, the industry, and/or competitors) (Subjective measures):</i>		
Market share	3	5
Overall performance	4	4
<i>Absolute (Objective and subjective measures):</i>		
Employee growth	14	2
Market share growth	3	5
<b>Financial Growth and/or Performance Measures:</b>	<b>64</b>	<b>I</b>
<i>Satisfaction with (Relative to expectations, past performance, the industry, and/or competitors) (Subjective measures):</i>		
Profitability	5	3
Sales performance and/or growth	5	3
<i>Absolute (Objective and subjective measures):</i>		
Sales growth	24	1
Profit growth	4	4
Return on assets	4	4
Return on sales	3	5
Net profit	3	5
Productivity or efficiency (Profit/sales; value-added/employee; profit/employee; sales/employee; net profit/employee)	3	5

Financial indicators of growth and performance are preferred to non-financial measures. Overall sales and employment growth measures account for 43 per cent, dwarfing the other proxies by comparison. A potential problem arises when studies combine these operationalisations in that the correlation between sales and employment growth has been found to be relatively low (Delmar, Davidsson & Gartner, 2003; Shepherd & Wiklund, 2009), requiring them to be considered as distinct variables. Coad (2009) adds that employment growth should rather be treated as an input (operational measure) and sales growth as an output.

Performance studies use broader operationalisations than growth studies and mostly focus on different measures of profitability, productivity and market share. Most of these performance studies do not differentiate between performance and growth measures and, by implication, treat them both as indicators of success or some desirable state (e.g., Singh, Reynolds & Muhammad, 2001). Given that SME growth and performance is central to this study, the appropriateness of

combining growth and performance as a dependent variable in empirical research design will be elaborated on next.

## **2.8 SME Growth and Performance Conceptualizations**

How we conceive, operationalise, and measure growth and performance constructs are crucial in effective research design. It is important that researchers should guard against equating growth to firm performance in favour of clarifying their study objectives. Growth is a metric reflecting the degree of change in some variable, defined by Dobbs and Hamilton (2007) “as a change in size over a given time period ... identified through linear interpolation between its observed size at the beginning and end of the period” (p. 313). Growth tends to be a more objective measure whereas performance tends to be a more complex and multidimensional concept (Delmar et al., 2003).

The differences between growth and performance operationalisation therefore seems to lie in the relative diversity and subjectivity of measures used. Performance measures tend to be more multidimensional and diverse than growth measures. Because performance is an outcome requiring value to be based on some benchmark, its measurement will always be seen as being subjective insofar as ‘successful’ performance is ‘all in the eye of the beholder’. Firm growth is applied to minimise the subjectivity inherent in performance measurement, and conform it to scientific objectivity and verifiability, making independent replication and verification of past research possible (Watson, 2010). Potential problems arise when growth and performance are combined into a single dependent variable irrespective of the evidence of a very low if not non-existent relationship between financial performance (measured in terms of profitability) and growth that requires the two to be regarded as independent (Coad, 2007).

Stressing the importance in differentiating growth from overall performance, Davidsson, Steffens and Fitzsimmons (2009) state that “growth is often not a sign of sound development” (p. 388). Therefore, scholars need to guard against the use of firm growth as a measure of performance. Davidsson et al. (2009) show that sales growth and profitability do not equally contribute to building value in an entrepreneurial sense and therefore do not automatically imply success. Because “profitability [is seen] as the horse that pulls the growth cart” (Davidsson et al., 2009, p. 403), profitability should rather be regarded as input to generate business growth rather than a final outcome of it. This is in line with evolutionary economic thinking (Nelson & Winter, 1982a) that regards profitability to be a measure for “fitness” which in turn determines a firm’s growth prospects. Not all growth is therefore profitable (Markman & Gartner, 2002). The trade-off between growth and profitability is also evident in agency theory that argues both that management tends to

favour sales growth above profitability (Baumol, 1962; Marris, 1964) and that such rapid sales growth ultimately leads to declining profitability to the detriment of the owners.

If any research question is framed to determine firm performance, then the performance proxies used should reflect the degree of 'success' achieved so that such proxies are hypothesised as being valuable to the firm's stakeholders, namely, government (e.g., employment growth and innovation output), entrepreneurs and owners (e.g., profits and market share), managers (e.g., sales growth) as well as employees (e.g., job security and salary levels). Most firm-growth studies, in contrast, aim to explain variance in firm growth by measuring it against some industry or historic benchmarks. Such growth studies are collectively referred to as the "growth as an outcome" research stream (see McKelvie & Wiklund, 2010, p. 264). A potential problem exists when researchers purport that they are measuring performance when they are rather clearly measuring objective growth variance. In doing so, they are taking for granted the economic and non-economic motives to grow by assuming that all firms aspire to maximise performance outcomes including continued growth or growth above the industry norm when this may not be the case (Wiklund, Davidsson & Delmar, 2003; Wiklund & Shepherd, 2003a). Most entrepreneurship scholars regard growth as the essence of entrepreneurship and a differentiator of entrepreneurialism from other businesses ventures (Sexton, 1997). Accordingly, growth may imply performance only when the study object relates to entrepreneurs or entrepreneurial firms. Such implied growth in entrepreneurship is not upheld by all scholars who say that entrepreneurs may choose to grow or not (Kirkwood, 2009) and limited growth does not result from inability or lack of opportunity alone but rather reflects the entrepreneur's limited desire to grow (Cliff, 1998; Gilbert et al., 2006). Indeed many SMEs, whether they are entrepreneurial or not, are not interested in growth (Wiklund et al., 2003).

Another issue in empirical research design relates to the difficulty in collecting valid performance data from SMEs. Not only are SME owners reluctant to share actual performance data, but also, what is supplied may not truly reflect actual performance because owners or managers tend to manipulate performance outcomes for various reasons, including potential tax implications (Sapienza, Smith & Gannon, 1988).

There are therefore merits in adopting multiple performance measures when considering construct validity problems with single measures (Richard et al., 2009). This thesis investigates SME growth and performance in its broader context as adopted in the strategic management and entrepreneurial orientation research streams. Firm performance so adopted is regarded as a multidimensional and highly aggregate construct reflecting multiple perceptual or self-reported measures of firm performance (Richard et al., 2009). Therefore, different performance measures

were developed and variously adopted in the studies comprising this thesis. In Studies Two and Three a composite index of firm growth and performance including four variables (sales growth, range of product or service growth, and profitability and productivity growth) were used to account for most aspects of SME performance (Pangarkar 2008; Wiklund & Shepherd, 2005). Two additional measures were created for supplementary analyses of relationships in Study Three to heed the call by Coad (2007) and Davidsson et al. (2009) for examining growth and performance separately to allow for a more nuanced and sounder interpretation. These measures account for any potential differences between effectiveness (sales growth and range of product or service growth), reflecting pure growth measures, as well as efficiency (profitability and productivity growth), reflecting performance indicators (Caloghirou et al., 2004; Mansury & Love 2008) (See Figure 4.2 in Study Three). Study Four adopts an even broader measurement approach (see, e.g. Kaplan & Norton, 1996), to include combined importance and satisfaction measures of customer satisfaction, market share, growth and profit. Study Four's weighted average performance index comprised 11 financial measures similar to the approach developed by Covin and Slevin (1989) and Gupta and Govindarajan (1984) and used widely in studies that include large numbers of SMEs (Brockman et al., 2012; Li et al., 2013; Verreynne et al., in press). The creation of the dependent variables used in this thesis accounts for both rent generation (Alvarez & Barney, 2004) and the appropriation of value which is central to entrepreneurial venturing (Davidsson et al., 2009).

The next step in the analysis moves from the dependent variables to investigate the independent variables, moderators and mediators used in the journal articles under review, discussed next.

## **2.9 Independent Variables, Moderators and Mediators**

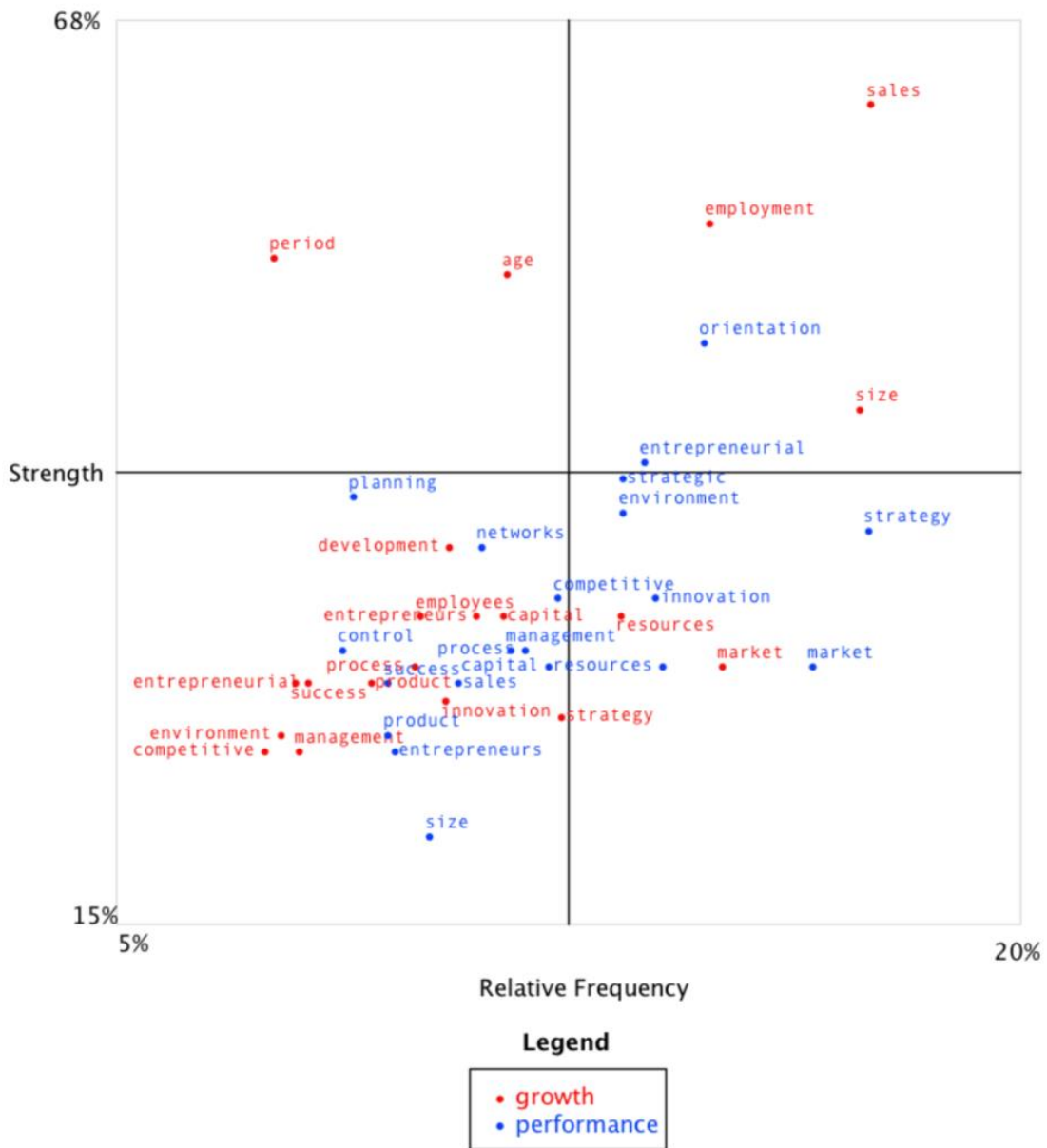
Leximancer provides results in quadrant graphics, ranked concepts and ranked compound concepts frequency bar charts. These output formats use semantic analysis to probe the data for concepts. Stated in quantitative research terms, it analyses the existence and strength of relationships between dependent variables (categories) and independent variables (emergent concepts). This involved generating two quadrant reports selecting growth and performance (Figure 2.3 and Table 2.3), and then market and capital (see Figure 2.4 and Table 2.4) as 'dependent variables' for the analysis. They were chosen because they represent the most dominant themes in both the initial and subsequent stable concept maps (Figure 2.1 and Figure 2.2). The graphics representing visual charts are displayed in a quadrant format along two axes (Leximancer, 2011):

- Relative frequency is a log-scale measure of the conditional probability of the identified concepts appearing in the full sample of studies, which is affected by the distribution of concepts across the selected categories.
- Strength is a measure of the reciprocal conditional probability of the concept appearing in the text associated with the category rather than frequency across categories.





















Ranked concept bar charts use prominence scores that rank concepts as absolute measures of correlation between the category and the concepts (Leximancer, 2011). Prominence scores are calculated by combining the strength and frequency scores (same as the quadrant coordinates) using Bayesian statistics.










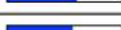












**Figure 2.3 Quadrant Graphics: Growth and Performance as ‘Dependent’ Categories**

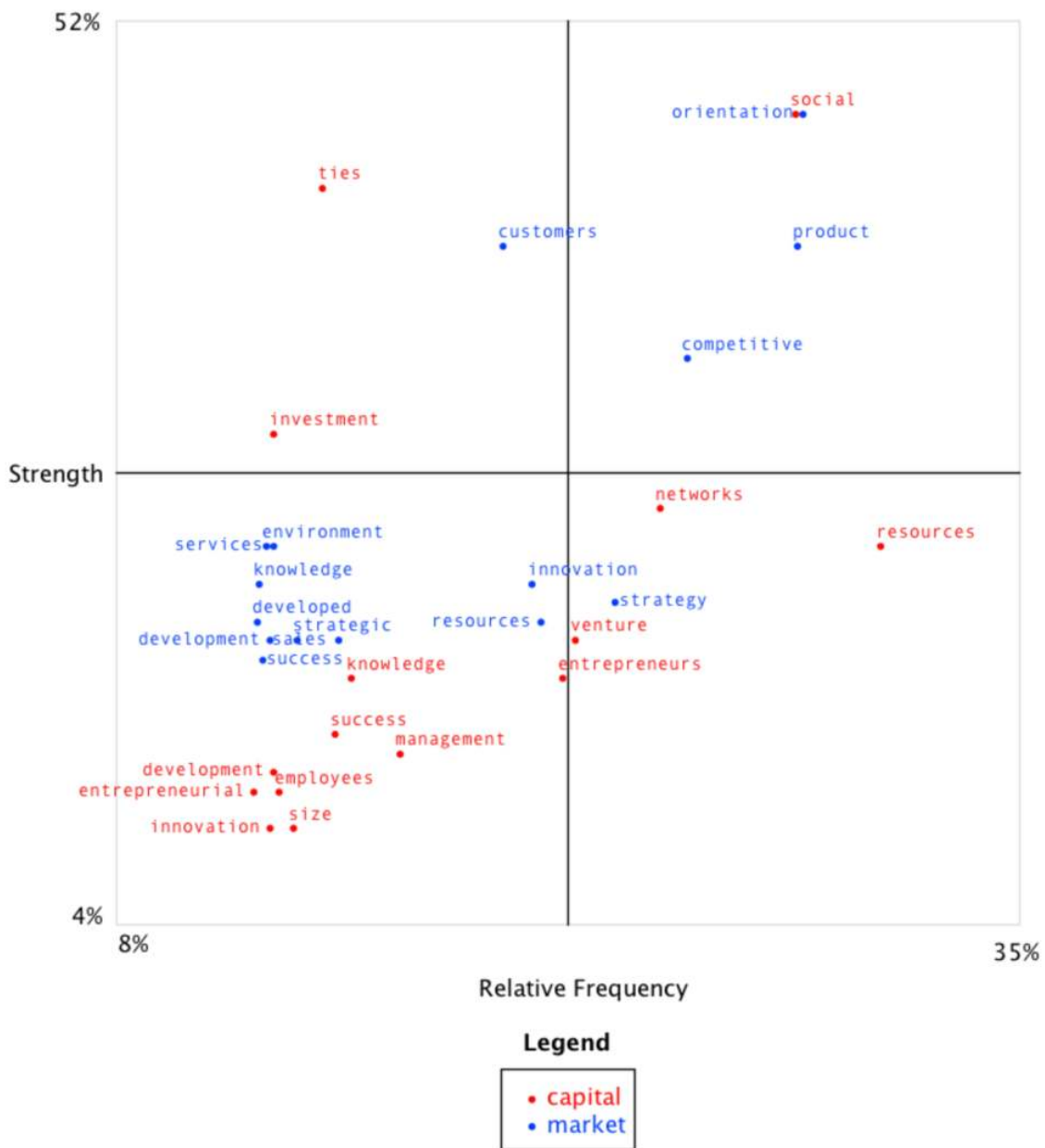


**Table 2.3 Ranked Concepts Bar Chart: Growth and Performance as ‘Dependent’ Categories**









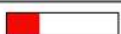





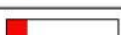
Category: growth			
Concept	Rel Freq (%)	Strength (%)	Prominence
sales	17	63	 2.7
employment	13	56	 2.4
period	7	54	 2.3
age	9	53	 2.3
size	16	45	 2.0
development	9	37	 1.6
entrepreneurs	9	33	 1.4
employees	8	33	 1.4
resources	11	33	 1.4
capital	9	33	 1.4
market	13	30	 1.3
process	8	30	 1.3
success	7	29	 1.3
product	8	29	 1.2
entrepreneurial	7	29	 1.2
innovation	9	28	 1.2
strategy	10	27	 1.2
environment	7	26	 1.1
management	7	25	 1.1
competitive	6	25	 1.1

Category: performance			
Concept	Rel Freq (%)	Strength (%)	Prominence
orientation	13	49	 2.4
entrepreneurial	12	42	 2.1
strategic	11	41	 2.0
planning	7	40	 2.0
environment	11	39	 1.9
strategy	16	38	 1.9
networks	9	37	 1.8
competitive	10	34	 1.7
innovation	12	34	 1.7
control	7	31	 1.6
management	9	31	 1.5
process	10	31	 1.5
capital	10	30	 1.5
resources	12	30	 1.5
market	15	30	 1.5
success	8	29	 1.4
sales	9	29	 1.4
product	8	26	 1.3
entrepreneurs	8	25	 1.3
size	8	20	 1.0
















**Figure 2.4 Quadrant Graphics: Capital and Market as ‘Dependent’ Categories**



**Table 2.4 Ranked Concepts Bar Chart: Capital and Market as ‘Dependent’ Categories**

Category: capital			
Concept	Rel Freq (%)	Strength (%)	Prominence
social	25	47	 7.3
ties	11	43	 6.7
investment	10	30	 4.6
networks	20	26	 4.1
resources	28	24	 3.6
venture	17	19	 2.9
entrepreneurs	17	17	 2.7
knowledge	12	17	 2.6
success	12	14	 2.1
management	13	13	 2.1
development	10	12	 2.0
entrepreneurial	10	11	 1.8
employees	10	11	 1.8
innovation	10	9	 1.5
size	11	9	 1.4

Category: market			
Concept	Rel Freq (%)	Strength (%)	Prominence
orientation	25	47	 4.8
product	25	40	 4.1
customers	15	40	 4.1
competitive	21	34	 3.5
environment	10	24	 2.5
services	10	24	 2.5
innovation	16	22	 2.3
knowledge	10	22	 2.2
strategy	18	21	 2.1
resources	16	20	 2.1
developed	10	20	 2.1
strategic	11	19	 2.0
development	10	19	 1.9
sales	12	19	 1.9
success	10	18	 1.9

The quadrant reports provide a more quantified picture of the data that were displayed in the concept maps. Growth is most closely associated with sales and employees, supporting the finding made from manual coding (Table 2.3) that they are deemed to be the most popular proxies for growth. Other concepts with high prominence relate mostly to either other measures of growth or controls normally used in the empirical growth studies under review. Networks and planning are prominent in the performance discussions but not present in the growth narrative. Similarly, networks are highly prominent in the capital discussion context but not in the market narrative. Innovation and resources are the only concepts prominent in all four categories. In summarising the above results, the study considers compound concepts and the actual text-blocks (not reported here) and find that the concepts best describing the ‘independent variables’ showing high prominence with both growth and performance includes:

- Exogenous variables: economic sector or industry; market (conditions, competitive, volatility, domestic and foreign) economic development; as well as
- Endogenous variables: age, size (employees and sales), capital (social and investment), resources, knowledge, network ties, innovation, management, (competitive) strategy, and entrepreneurial and market orientations.

Manual coding of the data found more than 100 independent variables relating to growth and performance. This diversity and the fact that numerous studies combined different proxies at different levels of analysis complicated accurate quantification of the dependent variables and their proxies. The Leximancer quadrant reports and ranked concept charts provided a useful way of identifying the most prevalent concepts within the dataset using manual coding. Therefore, the broader categorisation applied to the Leximancer results were also adopted for representing the manually coded results provided in Table 2.5.

**Table 2.5 Categories of Independent Variables, Moderators and Mediators Applied in Growth and Performance Studies**

<b>Endogenous antecedents, moderators and mediators:</b>	
<b>The manager, CEO and/or entrepreneur</b>	<ul style="list-style-type: none"> <li>• Personal demographic characteristics</li> <li>• Personal competencies</li> <li>• Personality traits (feelings, moods, or emotions)</li> <li>• Cognitive characteristics of owners (including reasoning methods)</li> <li>• Motivational goals (cognitive responses, beliefs, attitudes)</li> <li>• Behavioural responses and roles</li> </ul>
<b>Firm-level determinants of performance</b>	<ul style="list-style-type: none"> <li>• Common controls (age , developmental or firm life cycle stage and size)</li> <li>• Resources (including general resource slack):               <ul style="list-style-type: none"> <li>○ Physical resources</li> <li>○ Past performance/growth and profitability</li> <li>○ Capital availability or financial resources</li> <li>○ Human capital</li> <li>○ Social capital and networks</li> </ul> </li> <li>• Ownership structure</li> <li>• Innovation and knowledge strategy orientations (exploration versus exploitation)</li> <li>• Absorptive capacity</li> <li>• Operations (productivity, operations management activities and dominant technology employed)</li> <li>• Internationalisation</li> <li>• Organisational structure</li> <li>• Management, leadership styles and orientations</li> <li>• Strategic management, planning and decision making including organisational culture and dominant strategic orientation:               <ul style="list-style-type: none"> <li>○ Quality culture</li> <li>○ Competitive strategies (Porter)</li> <li>○ Market or customer orientation as well as marketing and market variables</li> <li>○ Entrepreneurial orientation</li> <li>○ Entrepreneurial management</li> <li>○ Small business orientation</li> </ul> </li> <li>• Information and control systems</li> </ul>
<b>Exogenous antecedents, moderators and mediators:</b>	
	<ul style="list-style-type: none"> <li>• Industry/market characteristics (market dynamism or turbulence; munificence;</li> </ul>

	<p>complexity and hostility; including Porter’s five-forces model)</p> <ul style="list-style-type: none"> <li>• External environmental hostility (political; legal; regulatory including government control and subsidies; international or global; economic including economic growth rate; demographic)</li> <li>• Country-specific, specific location or community specific characteristics (culture, population level, density and growth; employment growth; spatial specialisation and cluster indicators; type of enterprise zone; accessibility)</li> </ul>
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The above results obtained from manual coding and semantic analysis explicates the nature of the academic discourse in the SME growth and performance literature. These results require further interpretation by linking them with the theories of the firm, as discussed next.

## **2.10 Linking the Dominant Themes and Concepts with the Theories of the Firm:**

### **Integrating Economic and Strategy Theories**

A fully developed theory of the firm requires a researcher to borrow elements of ‘truth’ provided by the multiple existing theories, each providing a piece of the complete puzzle in an attempt to complete our knowledge of SME growth and performance (Hansen & Wernerfelt, 1989). The nature of the SME growth and performance debate reflects this multidisciplinary reality (see Section 2.5). More than 20 years ago, business policy and economic perspectives were regarded as being orthogonally independent in that they were “supplementary rather than complementary” (Hansen & Wernerfelt, 1989, p. 409). Strategic management theory has evolved since then as evident from the historic development of RBT, moving from being supplementary to becoming more complementary to the organisational economic perspectives, including the industrial organisation view and more recent contributions from Porter’s (1980, 1985, 2008) frameworks of competitive strategy (Mauri & Michaels, 1998; Spanos & Lioukas, 2001). Such integration is clearly visible in the analysis of the literature sample in Figure 2.2. While in no way purporting to represent the full picture, RBT does provide the hallmarks of a generalisable theory of the growth of the firm (Mahoney & Pandian, 1992). This is confirmed by 32 per cent of researchers who have adopted RBT in framing their studies. In the discussion that follows, the focus is therefore briefly on the commonalities, differences and potential complementarities of the economic and strategy theories, while simultaneously interpreting the semantic analysis’ concept map.

Firm diversity is the most commonly shared view among the economic and strategy theories as shown in Appendix A. It may therefore be regarded as the best starting point for integrating these theories to explain firm growth and performance. RBT, the industrial organisation view, transaction cost theory and evolutionary economic theory all regard firms as distinctly different (Nelson &

Winter, 1982a). They all grapple with why some firms succeed in obtaining above-normal rents and why others fail and exit their industries. Another distinct similarity between evolutionary economics and RBT relates to both theories embracing a dynamic or process perspective when looking at how firms develop over time. In evolutionary theory, the “biological concepts of variation, heredity and selection” is used in explaining the development of industries over time (Foss, Knudsen & Montgomery, 1995, p. 5). These principles are also applied, to a lesser extent, at the firm level and translate into the development of path dependent knowledge bases vested in ‘routines’ which impact upon the firm’s ability to prosper in its industry (Nelson & Winter, 1982a). Such routines are seen by RBT as path-dependent business processes “through which a firm develops its resources and capabilities, which in turn condition its ability to implement future activities, routines, and business practices” (Ray et al., 2004, p. 36). Business processes expose the resources and capability bundles so organised to the market where its value is ultimately recognised. The concepts ‘develop’ and ‘development’ are located at the intersection between the two dominant themes and is closely related with ‘resources’ (Figure 2.2). This is in line with both evolutionary economics and RBT. According to RBT management takes calculated ‘risks’ in developing valuable, rare, imperfectly imitable and non-substitutable (VRIN) resources (Barney, 1991; Dierickx & Cool, 1989) into capabilities to create sustained competitive advantage. Similarly the business processes responsible for developing resources into competencies share similarities with routines and the knowledge bases vested therein as reflected in the close proximity of the concepts ‘developed’, ‘resources’ and ‘knowledge’ within the concept map.

A distinct difference between the industrial organisation view and evolutionary theories on the one hand and RBT on the other is the level of analysis applied. The industrial organisation and evolutionary theories predominantly focus on explaining the development and evolution of industries, whereas RBT sees the firm as its primary study object. Industrial organisation economics, in particular, argues that industry choice primarily determines firm profitability (Schmalensee, 1988). The focus is on the structure-conduct-performance links at the industry level (Lipczynski et al., 2013), placing less emphasis on individual firms. In essence, this approach assumes that the industry structure as well as the prevailing competitive forces (Porter, 1980) influence behaviour and subsequently performance, although the direction of causation is not rigid or exclusive. Accordingly, industry structure based on the level of concentration, entry barrier conditions and product differentiation determines the conduct of industry participants which in turn impacts upon industry profitability and hence exogenously upon the performance of the individual firm (Bain, 1968).

By contrast, RBT argues that the industry only accounts for a small amount of variation in

firm performance (Rumelt, 1991). Economic rents are therefore attributed by RBT to business specific, endogenous rather than industry effects. Such business-specific effects relate to the differential endowment among firms' tangible and intangible resources. These seemingly opposing views have sparked a vigorous debate resulting in sometimes conflicting empirical findings. However, most of the studies seem to agree with RBT that firm-specific factors are more important than industry structure in explaining performance variance for both SMEs and large firms, albeit with nuanced differences (Caloghirou et al., 2004; Claver, Molina & Tarí, 2002; Galbreath & Galvin, 2008; Goddard et al., 2009; Mauri & Michaels, 1998; McGahan & Porter, 1997). Even though a firm's resource endowment seems to be favoured above industry structure, it has to be stressed that *both* have been found to impact performance regardless of their relative importance (Hansen & Wernerfelt, 1989). The empirical results do not reject one in favour of the other but rather emphasise the importance of observing both (Spanos & Lioukas, 2001). The finding of the firm-industry interaction effect as being important to SME performance underscores this (Eriksen & Knudsen, 2003).

The resource endowment of the firm ultimately determines and limits the choice of markets that the firm could enter as well as the level of profits it may expect, making both economic and organisation factors important determinants of firm performance (Wernerfelt, 1989). This means that firms should therefore enter markets where their critical and unique resources are superior to that of the competitors and where they can establish a strong market position. This is in line with the foundational Learned, Christensen, Andrews and Guth (1969) framework for business policy where firm success depends on matching "its internal competences and values to its external environment" (Porter, 1981, p. 610). Firms also require constant realignment with "continually changing productive opportunity" as the external environment and their own "productive services and knowledge" change (Penrose, 1959, p. 110). Miles and Snow's (1984, p. 11) conceptualisation of business excellence, being a function of internal and external 'fit', builds on the latter frameworks and is especially evident in the concept map (Figure 2.2). External 'fit' is "a dynamic search that seeks to align the organisation with its environment and to arrange resources internally in support of that alignment" (Miles & Snow, 1984, p. 11). Strategy is the external alignment mechanism and organisational structure and management processes are the internal elements that need to align with and support a chosen competitive strategy. 'Fit' is fundamental to survival and success, but difficult to achieve in practice, especially in rapidly changing market environments that require continual strategic adjustment which in turn requires changes to internal structures and processes (Miles & Snow, 1986).

The concept map in Figure 2.2 visibly represents the above reasoning about the SME growth

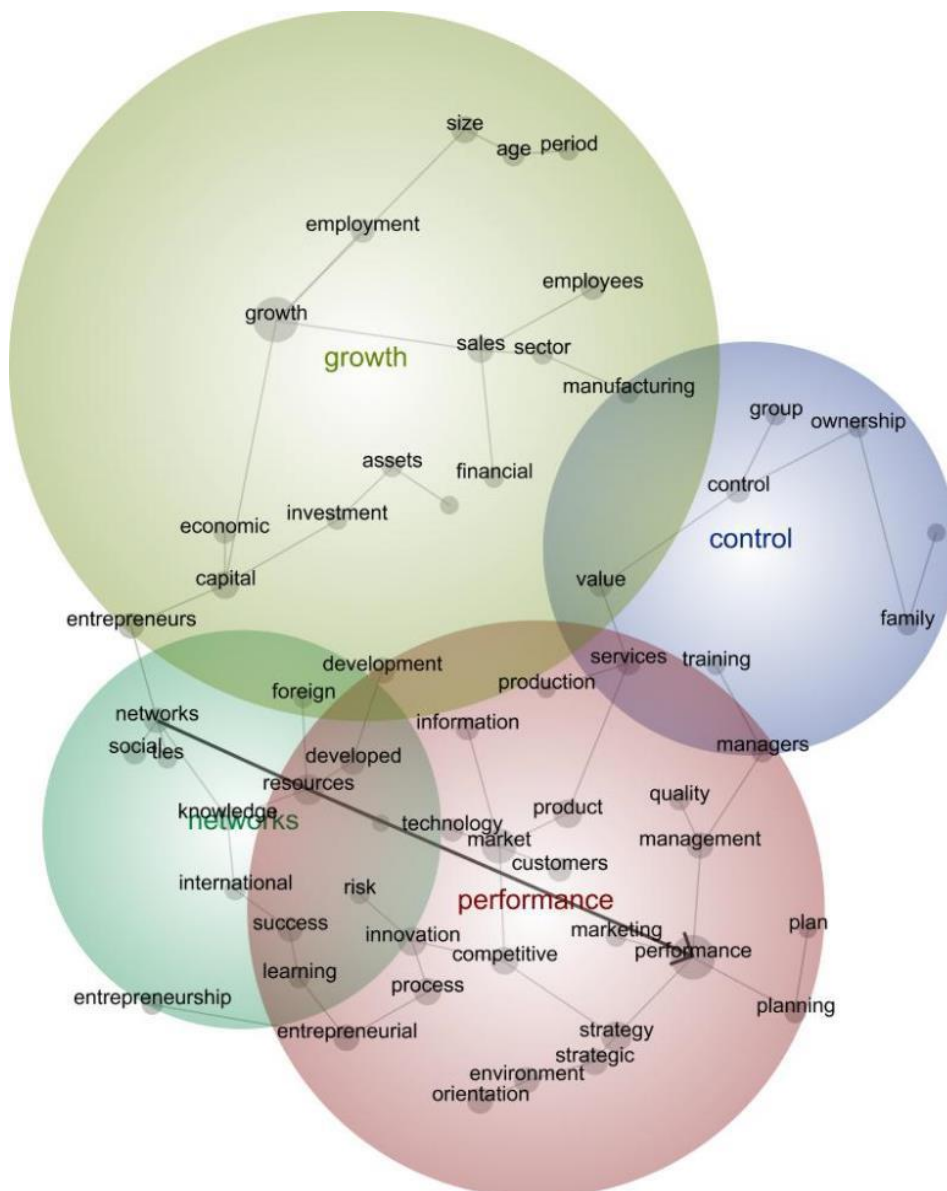


and performance literature by acknowledging both endogenous and exogenous effects as well as the importance of strategic fit. The following discussion focuses on five specific areas of the concept map containing most of the endogenous and exogenous explanatory concepts, namely, the whole 'capital' area, the 'capital-only' area, the intersection where the 'capital' and 'market' themes overlap, the whole 'market' area, as well as the 'market-only' area. Observing the dominant concepts in these thematic areas coupled with the theories on firm growth and performance assist us to identify potential areas of further research. Each of the thematic areas are therefore investigated and discussed next.

### **2.10.1 Implications for further research**

After looking at the whole of the 'capital' theme area of the stable concept map (Figure 2.2), a number of concepts that resemble both tangible and intangible resources as required by RBT to be bundled together for obtaining competitive advantage (Barney, 1991) were identified. The concepts in the 'capital-only' area represent both tangible as well as intangible assets and resources, including the role of the 'entrepreneur', physical 'capital' and 'financial' resources. The 'social capital' embedded in 'networks' is also regarded as an important means of acquiring, developing and leveraging 'resources' to counter the resource disadvantages experienced by SMEs (Davidsson & Honig, 2003; Noteboom, 1993). A knowledge pathway analysis performed with Leximancer indicates (see Figure 2.5) that semantically analysing the literature confirms Noteboom's (1993) notion with the arrow linking networks with resources and performance. To establish the knowledge pathway, the concept map (Figure 2.1) from the first-round analysis had to be used as 'performance' was omitted from the stable map (Figure 2.2). A pathway analysis in Leximancer indicates the strongest (lowest-cost) pathway between two selected concepts on the map and is intended to tell stories emerging from the text, and focus on indirect connections between concepts (Leximancer, 2011).

**Figure 2.5 Leximancer Concept Map: Networks to Performance Knowledge Pathway  
(Networks – Resources – Performance)**



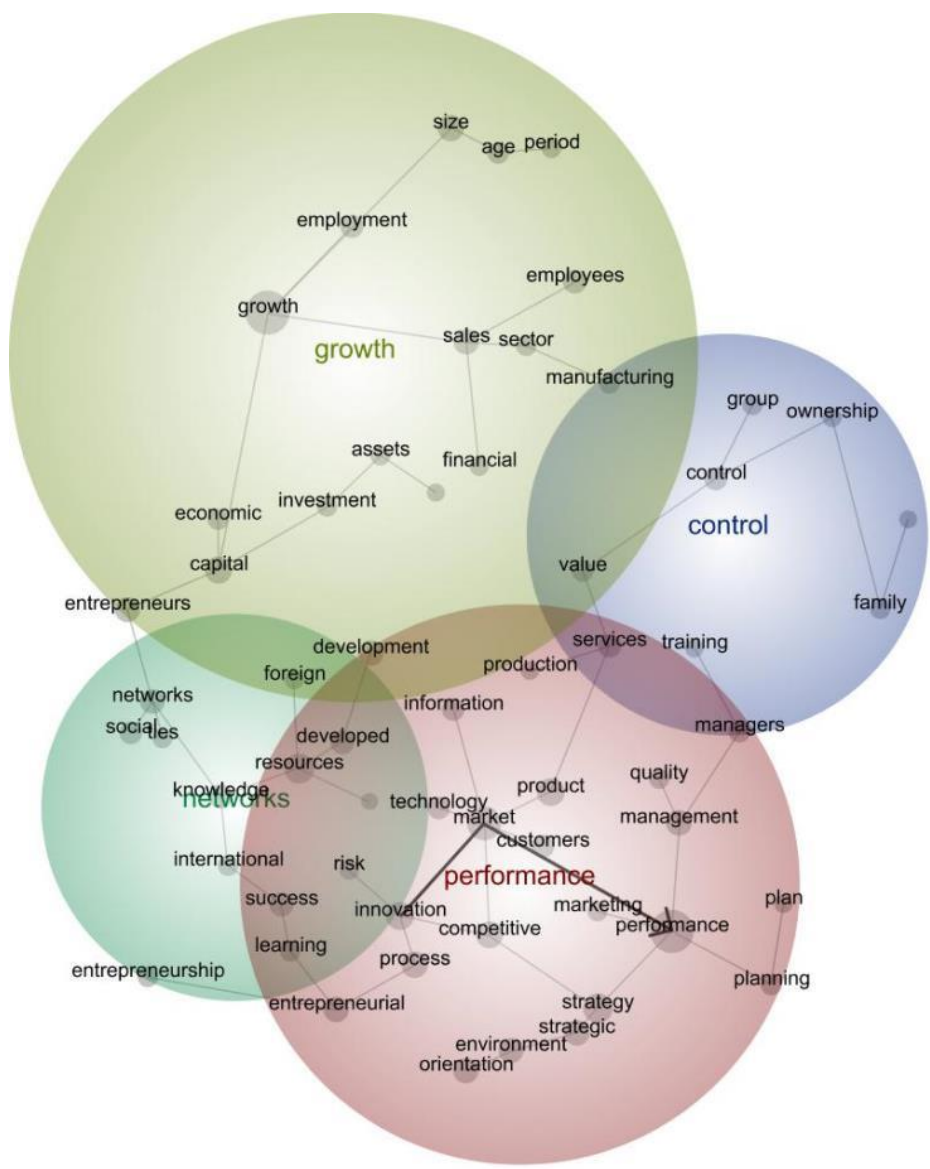
Concepts situated at the intersection of the ‘capital’ and ‘market’ themes in Figure 2.2 are predominantly intangible in nature. The intersection of the ‘capital’ and ‘market’ themes seems to be analogous with Miles and Snow’s “external fit” conceptualisation of organisational alignment with its external market (1984, p. 11). The concepts of ‘information’, ‘knowledge’ and ‘learning’ are tacit, intangible resources that are associated with Miles and Snow’s “dynamic search” (1984, p. 11). Similarly, the concepts of ‘management’ and ‘entrepreneurial’ are essential for developing and using resources as well as the internal arrangement of resources in support of alignment (Miles & Snow, 1984). This observation also echoes empirical findings that indicate the importance of managerial and entrepreneurial human capital, attributed to learning and knowledge as important

for entrepreneurial venture success (Unger et al., 2011). Owing to their inimitable nature, the importance of tacit, intangible resources to SMEs in building sustainable competitive advantages within the competitive environment is well established within RBT (Ray et al., 2004) (See Section A.9 in Appendix A). The close physical proximity between the concepts ‘knowledge’ and ‘resources’ in the concept map (Figure 2.2) corresponds with this position held in RBT and more specifically the knowledge-based view, arguing that knowledge is among the most universal of intangible resources that meet the criteria for being valuable in building sustainable competitive advantage (Grant, 1991; 1996b). The concepts ‘foreign’ and ‘international’ relate to the academic literature on SME internationalisation. The close proximity between the concepts ‘international’, ‘knowledge’ and ‘resources’ in the concept map accords with the opinion of Hitt et al. (2001, p. 487) that “entry into new international markets allows the firm to learn [so that] the development and diffusion of this knowledge creates dynamic capabilities and competencies”. In short, the analysis suggests that the literature holds that intangible resources are most important for building competitive advantage for tangible resource disadvantaged SMEs (Miller & Shamsie, 1996; Thornhill & Amit, 2003).

The external or ‘market-only’ area of the concept map comprises descriptive variables commonly used in empirical analysis as industry controls, including ‘competitive’ descriptors as well as ‘market’ or industry descriptors (‘product’, ‘service’ and ‘technology’). In addition ‘innovation’ and ‘strategy’ are prominent concepts with ‘planning’ and ‘marketing’ having less prominence (reflected by the relative sizes of the concept circles). Returning to Miles and Snow’s strategic “fit”, the concept map in Figure 2.2 clearly confirm ‘strategy’ as being the external alignment mechanism (Miles & Snow, 1984). Strategy is therefore market or externally oriented in creating a sustainable competitive position, given the prevailing competitive nature of the market. This is also in line with Porter’s (2008) competitive forces framework as well as RBT as reflected in the close spatial proximity between ‘strategic’ and ‘competitive’ concepts depicted on the concept map (Figure 2.2). The ‘innovation’ concept and the impact of ‘technology’ are central to evolutionary economic thinking, especially the impact that changes in the technological paradigm have at the industry level. In this regard, Schumpeter (1950, p. 83) sees innovation as the fundamental mechanism underpinning growth within the capitalist economic system as “creative destruction” is “incessantly destroying the old one [and] incessantly creating a new one”. Accordingly, business strategy is only significant if it takes account and reflects the realities of the evolutionary process or “the perennial gale of creative destruction” in which it operates (1950, p. 84). The importance of innovation’s impact on firm growth and performance within the academic literature under review is clearly reflected in the direct link between the ‘innovation’ and ‘success’

concepts. Knowledge pathway analysis (Figure 2.6) indicates that the ‘market’ concept links ‘innovation’ and ‘performance’ with least resistance, suggesting that innovation initiatives may be directed at ensuring competitiveness, relevance and adjustment to a changing market environment. This observation is again emphasising that innovation capacity as an intangible resource and the business processes that exploit innovations are less imitable and therefore form the basis of more sustainable competitive advantage for SMEs (Ray et al., 2004, p. 26; Barney, 1991).

**Figure 2.6 Leximancer Concept Map: Innovation to Performance Knowledge Pathway (Innovation – Market – Performance)**



Innovation should therefore, by implication, create value in the market and thus impact upon firm performance. This is directly related to the business model construct as a business process that exploits innovations and describes how the firm creates value for its customers and how it shares in

that value (Teece, 2010). Performance may also result from directing innovation efforts towards influencing or altering the competitive landscape in existing markets (Su et al., 2011). In doing so, innovation efforts would not only be directed at products, services and organisational processes but would also imply business model innovation (Zott & Amit, 2007). Central to Chandler's (1990) thesis is the realisation "that business organisations shape markets" (Teece, 1993, p. 199). Business model innovation could be conceptualised to relate it to Chandler's "organizational innovations", which involve the ability to create and transform industries and which are imperative for exploiting scale and scope economies (1990, p. 21). However, it is debatable how applicable this may be to SMEs. The contribution of business models and business model innovation to improving firm growth and performance has recently become a hot topic among strategy scholars (DaSilva & Trkman, 2014). Innovation capacity and social capital embedded in networks as intangible resources are however not intrinsically valuable as per RBT (Priem & Butler, 2001). They become valuable when they are organised to create value for the customer, implying business model design. Empirical evidence for confirming a link between business model design and improved growth and performance is absent in the sample of SME literature reviewed in this study. Therefore, further attention should be given to this identified gap in the extant literature as will be discussed next.

## **2.11 Summary**

This systematic literature review set out to identify and interpret emergent concepts, themes, trends and gaps in a large sample of SME growth and performance literature. The review draws four conclusions after its analysis.

First, the findings confirm the diversity in theories associated with SME growth and performance as complex phenomena. This complexity necessitates the adoption of many different theoretical lenses and operationalisations of constructs. The main theories adopted in the literature could be broadly classified as falling into one of the following categories arising from the theories that researchers have used to develop their independent variables (e.g., behavioural theories or human capital), theories of the firm (transaction cost economics), theories of firm growth and performance (RBT) or a combination of these. This finding shows that none of the theories individually explains the complexities of SME growth and performance adequately. My view arises from observing an increased tendency among researchers to combine theories in designing their research models, rather than relying on a single one. It also seems that RBT with its more recent extensions is favoured among researchers in this field because it provides a more generalised theory of firm growth and performance. In doing so, RBT acts to complement seemingly orthogonal

independent theories of the firm, like the industrial organisation view and transaction economics in an attempt to account for both endogenous and exogenous antecedents to firm growth and performance, by also taking consideration of the importance of maintaining path dependent strategic fit.

Second, the dependent variables growth and performance are diversely operationalised in research through more than 55 different proxies. The practical and theoretical issues in operationalising growth and performance are highlighted to the extent that the use of multiple measures, as applied in the current thesis, are justified. Third, manual coding placed the many explanatory variables associated with SME growth and performance into three broad categories, namely, manager or entrepreneur, firm level determinants, and exogenous antecedents. Leximancer analysis revealed the prominence of innovation and networks (including social ties) as concepts highly relevant to the SME growth and performance academic literature. The next chapter in this thesis focuses on the nature of how innovation impacts upon SME performance. After establishing the innovation-performance relationship, in Chapter 4 the focus moves to include the second prominent concept, networks. Social capital vested in network relationships is studied as it relates to innovation and SME performance. Fourth, missing in this analysis, but gaining prominence in the broader study of strategy and hence also firm performance is the business model construct. Very little empirical evidence is available to provide any substance to claims that business models positively impact upon performance. Study Four of this thesis (see Chapter 5) investigates the impact of business model design on SME performance to follow up the finding of this study depicted in Figure 2.6. It shows that business model design themes mediate the relationship between innovation and firm performance.

SMEs have less market power and limited resources to develop competitive advantage (Connor, 2002). According to RBT, the resources required for the development of competitive advantage comprise bundles of both physical and intangible resources, of which the latter has the greatest strategic potential (Ray et al., 2004; Barney, 1991). These intangible resources “tend to be path dependent, socially complex, and causally ambiguous”, making them and the business processes that exploit them, less imitable and therefore the competitive advantage more sustainable (Ray et al., 2004, p. 26; Barney, 1991). Empirical research confirms that resource strapped SMEs could develop competitive advantage and enhance their survival by relying heavily on leveraging superior intangible resources (Coleman, Cotei & Farhat, 2013). It is therefore prudent that innovation, networks and business model design constitute the primary independent variables of the empirical studies in this thesis as they relate to intangible resources and business processes that

exploit them which are especially relevant for SMEs as confirmed in this systematic literature review.

Last, this study also contributes more broadly to the SME growth and performance literature. With few exceptions (e.g., Dobbs & Hamilton, 2007), most literature reviews and meta-analyses with similar aims study firms of all sizes. By generally focusing on firm growth, these studies seldom account for the more inclusive construct of firm performance as adopted in this review. From a methodological perspective, the use of a novel approach (Leximancer content analysis) provides a new means of adding to the content-analysis techniques available to management disciplines to test dominant theories and emergent themes. This review frames and directs the studies undertaken and informs the operationalisation of the main dependent variable used in this thesis. Network ties and business models, as well as innovation and its impact upon SME performance will hence be the focus of the three subsequent studies. The main aim of the next three studies in this thesis is to provide clarity and add to the research into the controversial nature of the network, innovation breadth, business model design, and performance relationships.

### **3. STUDY TWO: EXPLORING THE DYNAMIC INVERTED U-RELATIONSHIP BETWEEN INNOVATION BREADTH AND SME PERFORMANCE: THE DARK SIDE OF OVEREXTENDED INNOVATION BREADTH**

#### **ABSTRACT**

Pro-innovation biased literature suggests that all innovation improves performance outcomes for SMEs, a conjecture that this study questions. This study also investigates the directional, linear and temporal nature of the innovation breadth – performance relationship. Evidence from analysing a large sample of Australian SMEs suggests that the innovation breadth – performance relationship is mutually beneficial, reciprocal and characteristic of nonlinearity (an inverted U-shape). The diminishing and negative returns associated with the inverted U-shape relationship indicate that overextending innovation too broadly by introducing many types of innovation simultaneously would be counterproductive. No evidence of lengthy time lags is found between innovation breadth introduction and SME performance. In their quest to optimise performance, SMEs are advised to focus on a moderate number of innovation types.

#### **3.1 Introduction**

Study One of this thesis showed that innovation is one of the most noticeable of the numerous endogenous and exogenous factors that affect firm performance and determine success or failure of business ventures (Subramanian & Nilakanta, 1996). Since Schumpeter (1950) advanced his theory of creative destruction, postulating that large firms in concentrated markets are more likely to innovate, the relationship between innovation and performance in large firms has received much scholarly attention (Damanpour & Evan, 1984; Gopalakrishnan, 2000; Kleinschmidt & Cooper, 1991; Lööf & Heshmati, 2006; Wong et al., 2007). Schumpeter (1950) did not regard the role of SMEs as important, seemingly contrary to his earlier work (1934), seeing instead large monopolistic firms as the drivers of innovation and economic progress (Nooteboom, 1994). SMEs have thus long been burdened by the Schumpeterian size handicap, having little resource slack to generate and commercialise innovations, leading to SMEs being kept outside the domain of innovation research for a long time (Audretsch & Lehmann, 2005). That is until recently, when a wave of new studies began to acknowledge how entrepreneurial SMEs contribute to innovation (Caloghirou et al., 2004; Lee et al., 2010; Mohannak, 2007; O'Regan, Ghobadian & Sims, 2006;



Raymond & St-Pierre, 2010; van de Vrande et al., 2009). Yet, despite this broader acknowledgement, empirical studies have not reached definitive conclusions about the relationship between innovation and firm performance in SMEs (Rosenbusch et al., 2011).

SMEs play a vital role in economies worldwide. Within Australia, they represent 99.83 per cent of all trading businesses (ABS, 2014) and contribute 46 per cent to gross domestic product (ABS, 2010). The OECD (2010b: 16) acknowledges that the environment for innovation is changing to the extent that SMEs are playing an increasingly important role as innovators in that “Increasing incomes, more ‘niched’ market demand and changing technologies have reduced the structural disadvantages of small firm size stemming from their more limited economies of scale”. Consequently, more conclusive evidence regarding the nature of the innovation – performance relationship could improve practice as well as public policy responses towards SME development. From an academic point of view, inquiry into the role of innovation in the performance of SMEs is only starting to draw attention (Rosenbusch et al., 2011). Uncertainties and contradictions exist regarding the complex nature and role of innovation, calling for clarity on inconclusive empirical findings (Baldwin & Gellatly, 2003; Cho & Pucik, 2005). Issues such as the directionality and linearity of the innovation – performance relationship also require further attention (Mansury & Love, 2008). As such, this study’s research contributes in four ways.

First, here seems to be an implicit pro-innovation bias in the innovation literature that does not fully account for the higher proportional risks and constraints associated with SME innovation (compared to large firms), making SMEs ill-prepared to invest in innovation across a broad spectrum of business activities (Liao & Rice, 2010). The evolutionary theory of economic growth acknowledges “that the flexibility of routinized behaviour is of limited scope and that a changing environment can force firms to risk their very survival on attempts to modify routines” (Nelson & Winter, 1982b:400). SMEs therefore face a conundrum: they have limited scope to change their routines that increase innovation breadth, and they face a survival and growth imperative to craft market offerings and new routines that reflect diversity, variations, combinations, and mutations. SME owners and practitioners need clarity about the performance benefits associated with innovation breadth. By implication, the current mantra is that more innovation is better than less or none at all, regardless of how broadly the innovation net is cast. While this may hold true for larger firms, it may not apply to SMEs that are hampered in their innovation efforts by resource constraints (Rosenbusch et al., 2011).

Second, most empirical studies provide little guidance on how innovation relates to SME performance over time due to their cross-sectional designs (Mansury & Love, 2008; Prajogo, 2006). These designs may play an important role in the inconclusive understanding of the innovation –

performance relationship. This study aims to provide insight into the length of potential payback and lags in this relationship. Third, while the positive relationship between innovation and subsequent performance has been established, the relationship between performance and subsequent innovation is less clear (Bowen et al., 2009). The direction of the relationship should therefore be ascertained to determine if innovation breadth positively relates to performance or if performance generates slack that would allow experimentation and innovation across a broader range or both.

Last, innovation research is replete with diverse proxies for measuring innovation. Innovation typologies are used to reflect and account for the multidimensional nature of the construct (Hipp & Grupp, 2005). Yet, mismatching the conceptualisation and operationalisation of the concept is typical in this field in that researchers operationalise innovation in its broadest sense, yet only measuring a specific dimension, for example process innovation. This practice leads to many seemingly contradictory empirical results evident in the literature (Audretsch & Lehmann, 2005). The need to specify clearly what dimensions of innovation are measured, and use or develop appropriate terminology to ensure replication and comparability of empirical work in this field is therefore dire. It is therefore argued that innovation as measured by applying the OSLO Manual's definition, and used in community innovation surveys, is a measure of innovation breadth or diversity and not 'innovation' *per se*. Addressing these existing gaps in the link between innovation and SME performance, this study uses longitudinal data collected by the Australian Bureau of Statistics (ABS) to explore the relationship of innovation breadth with SME performance over time, as it varies "in time and space" (Audretsch, et al., 2014: 745). This study investigates the reciprocity and linearity of the relationship specifically from three perspectives: resource-based (Penrose, 1959; Schumpeter, 1934; Wernerfelt, 1984) and its extension, dynamic capabilities (Caloghirou et al., 2004), as well as the evolutionary theory of economic development (Nelson & Winter, 1982b). This study proceeds as follows: First, innovation breadth as an innovation typology is discussed and its theoretical foundation is argued. Second, the study explains the relationship between innovation breadth and SME performance and develops hypotheses about the reciprocal, curvilinear and dynamic (payback lag and trajectory) nature of this relationship. Third, it presents both the data used and its methodology and clarifies the operationalisation of the main and contextual variables used in the models tested. Last, it relates and discusses the results of the statistical analysis.

### **3.1.1 Innovation breadth as innovation typology**

The term innovation originates from the Latin word *innovare*, meaning to make something new (Tidd & Bessant 2007). Innovation encompasses invention, but it is only when an invention or creative idea is institutionalised, implemented or commercially exploited that it becomes innovation

(van de Ven 1986). The term is polysemic among different researchers as evident from the numerous broad to narrow definitions (Damanpour & Evan 1984; Salavou & Lioukas 2003). The development of such diverse operationalisations has led to varying empirical results (Crossan & Apaydin, 2010). Consequently, these measurements of innovation seem to be “fraught with ambiguities and challenges” (Audretsch & Lehmann, 2005: 282) as is clear from some of the proxies that are used: typologies of innovation, for example, product, process and organisational innovations (Damanpour, 1991; Morone & Testa, 2008; Cooke & Wills, 1999); dichotomous adoption or non-adoption of innovation (Robson & Bennett, 2000); an innovativeness index based on a variety of variables (Bruton & Rubanik, 2002); aggregates of all innovations adopted within the firm (Acs & Audretsch, 1990); percentage of sales generated by innovations (Parker, Storey & Van Witteloostuijn, 2010); counts of patent listed (Lecerf, 2012); innovation inputs such as R&D or other innovation-related activities, processes and expenditures (Hull & Rothenberg, 2008; Liao & Rice, 2010); and novelty or radicalness scales (Freel & Robson, 2004). In an effort to present clarity and to enhance the comparability of empirical findings, this study argues that surveys adopting the OSLO manual’s definition of innovation (OECD, 2005), should use ‘innovation breadth’ as a proxy for innovation. The OSLO manual’s definition of innovation is presented in Section 4.2 of Study Three. This definition includes a typology of innovation that is discussed next.

The use of innovation typologies in empirical studies helps to manage diversity and reduce the inherent complexity of innovation as a multidimensional phenomenon (Hipp & Grupp, 2005). Innovation as study object is generally categorised according to two dimensions: as a process and as an outcome (Crossan & Apaydin, 2010; Siguaw, Simpson & Enz, 2006) although the distinction is not always obvious. In essence, an innovation process describes *how* the innovation is created so as to achieve an innovation outcome (*what kind* of innovation). Most empirical research, including this study, focuses on innovation as outcome. What follows therefore discusses the typologies of innovation outcomes.

In adapting the typology developed by Crossan and Apaydin (2010), innovation as outcome can be further classified according to two dimensions: the *type* or *form* of innovation and the degree of *novelty* or *change*. First, innovation *type* or *form* refers to innovations in different functions of the firm including technical and administrative innovations. Technical innovations include products and processes as well as the technologies used to produce these products or to deliver services, whereas administrative innovations include human resources, the organisation’s structure and administrative processes (Gopalakrishnan & Damanpour, 1997). More recently researchers take lead from the OSLO manual’s guidelines to collect and interpret innovation data (OECD, 2005). Accordingly, innovation is measured by individually identifying each type of innovation in four practices: goods

and services; operational processes; organisational or managerial processes; and marketing methods. Another more recent approach is to describe the latter two as business model innovation (Crossan & Apaydin, 2010), discussed in Study Four of this thesis. The innovativeness of the firm and hence its innovation orientation is said to be linked to the firm's ability to integrate innovation across all functional areas of the business (Siguaw et al., 2006).

The second typology dimension encompasses two closely related constructs: the degree of relative *novelty* of the implemented innovation and the degree of *change* in the activities of the firm or industry required by the innovation. The degree of novelty designates the relative newness of the innovation at the firm, market, industry, national or international levels. The degree of change relates to novelty in that it differentiates between incremental and radical innovations (Gopalakrishnan & Damanpour, 1997). Incremental innovations require very little change whereas radical innovations represent a fundamental shift in, and clear departure from, existing routines and practices, requiring a high degree of new knowledge (Dewar & Dutton, 1986; Henderson & Clark, 1990). As such, a radical innovation is associated with new technologies that results in new markets (Garcia & Calantone, 2002). They cause discontinuities at the market and industry levels but are mostly new to the world innovations (Darroch, 2005; Garcia & Calantone, 2002).

Given the above typology, *innovation breadth* refers to the implementation of different types of innovation, such as goods and services, operational processes, organisational or managerial processes and marketing methods measured by dichotomous variables as per the OSLO manual (OECD, 2005). Innovation in the context of this study therefore relates to innovation breadth not depth. It is an aggregate variable representing the number of different types of innovations that a firm would have implemented within the past year of the survey being administered. Innovation breadth does not count the number of actual innovations implemented nor the amount of sales or profit generated by them. It also does not distinguish between radical and incremental innovations. To maintain the anonymity of survey respondents, the ABS BLD does not disclose data that measure the relative degree of novelty. Therefore, innovation breadth has as minimum novelty requirement that the innovation be new or an improvement at the focal firm level.

Other studies that have used the OSLO manual's typology as adopted in most community innovation surveys refer to this proxy as a firm's 'types' (Gunday et al., 2011; Varis & Littunen, 2010) or 'levels' (Roxas, Battisti & Deakins, 2014) or 'categories' (Darroch, 2005) of innovation. To illustrate the confusion further, Liao and Rice (2010: 120), who also used the ABS's BLD, operationalise "transformation outcomes" to be measured by changes in product and service range as well as changes in distribution and marketing, whereas "innovation" is measured by R&D intensity, training intensity and production technology intensity. Surely the latter proxy is more an

indication of the firm's commitment or ability to engage in innovation whereas the former is a proxy for diversity in innovation outcomes or innovation breadth. With the exception of a few, such as Love et al. (2011), most scholars do not appreciate that the OSLO manual or similar typologies does not measure 'innovation' *per se*, which is, as explained above, a multidimensional construct with many different meanings.

Based on this understanding, the concept of breadth in innovation has been adopted in open innovation studies where 'innovation search breadth' measures the number of different external and internal knowledge sources of information used in the innovation process (Laursen & Salter, 2006). Leiponen and Helfat (2010) as well as Leiponen (2012) also looked at breadth when investigating the benefits of breadth in innovation objectives. They did not look at the breadth of actual innovation types, but rather the breadth in strategic motives for innovation or breadth in innovation strategies at the firm level. Choi and Williams (2013: 432) recently investigated the "diversity of innovation" by measuring patent counts in different technological fields. These different technological fields relate to economies of scope and do not specifically test for different types of innovations that may or may not be related to a specific technological field. They also measure patent counts and not actual implemented innovations. As far as the author is aware, very few studies apply innovation breadth, as conceptualised in this thesis. Love et al. (2011: 1450) describes the implementation of different types of innovation activity, namely, "service, business process, managerial, strategic, marketing and organisational" as "innovation diversity". Roxas et al. (2014) also apply the OSLO manual's measure of innovation but do not allude to it being an indicator of innovation breadth or diversity. They simply refer to their dependent variable as "innovation" (Roxas et al., 2014: 446). Innovation scholars should guard against broadly defining and categorising specific innovation typologies as representing 'innovation'. This widespread tendency results in inconsistent or incomparable findings. Innovation constructs should be unambiguously expressed and appropriate terminology should be developed and consistently adopted. Not only is it necessary to correctly conceptualise innovation variables but also to argue their theoretical grounding, as discussed next.

### **3.1.2 Innovation breadth – Theoretical foundation**

The OSLO manual's typology shares commonality with Schumpeter's (1934) classification. Schumpeter (1934) acknowledged the importance of diversity in innovative activity by clearly differentiating between different types of innovation, including product, process, market, input and organisational innovations. However, criticism has been expressed by Adams (2003) about such typologies found in innovation research. Most important here is the argument that apparently

intuitive categorisations of innovation, visible in the OSLO manual and applied in this thesis (innovation breadth), appear not to be based in science (Adams, 2003). Innovation breadth, in the absence of *a priori* theory as a basis for categorising, would accordingly be classified as taxonomy not typology (Meyer, Tsui & Hinings, 1993). This thesis disagrees with that argument. Both the evolutionary growth theory (Llerena & Zuscovitch, 1996; Nelson & Winter, 1982a; 1982b; Nelson, 2002) and RBT (Barney, 1991; Teece, 1984; Teece et al., 1997; Wernerfelt, 1984) provide theoretical foundation for the use of innovation breadth as proxy for innovation output.

First, Nelson and Winter (1982b) developed their evolutionary theory of economic change from Darwinian evolutionary biology as well as Schumpeterian innovation-based economic theory. Diversity, variations, combinations, and mutations feed the natural selection mechanism as basis of adaptation in biological evolution. Similarly, the diversity in products and firms drives economic evolution and growth (Llerena & Zuscovitch, 1996). An essential aspect of Schumpeterian competition is “the diversity of firm characteristics and experience and the cumulative interaction of that diversity with industry structure” (Nelson & Winter, 1982b: 30). Innovation in this sense represents “change in routine” (Nelson & Winter, 1982b: 129). It is therefore argued in this study that diversity and variety in innovative activity and output at the firm or micro-level (as expressed by the innovation breadth proxy) results from changing routines or new combination of routines within the firm. Innovation breadth in turn impacts upon the firm’s adaptability to its competitive environment and subsequent growth.

Second, as will be discussed in the next section, according to RBT, innovation is an important source of competitive advantage (Barney, 2002; Harmancioglu, Droge & Calantone 2009). Diverse competencies and regimes, absorptive capacity, and network linkages are required to successfully initiate and implement different types of innovations. Resource slack (e.g., administrative capacity, financial, human and social capital) would also impact upon the firm’s ability to increase the breadth or diversity in innovative activities applied to a range of business functions which would in turn impact upon firm performance. Recent empirical research, which finds a positive relationship between innovation diversity and business growth, supports this assertion (Love et al., 2011) and thus supports such innovation breadth. Therefore, innovation breadth as measure of diversity in innovative activities reflects broader application of different sets of resources required for its implementation. It also provides a composite measure to determine the impact of different degrees of innovation breadth on SME performance, as elaborated next.

### **3.2 The Innovation Breadth – Performance Relationship**

As discussed in the previous section, the link between innovation and performance has typified evolutionary economics, RBT and dynamic capabilities perspectives. According to the first (Nelson & Winter, 1982b), diversity in firm innovation activity makes the firm more flexible and adaptable in dealing with market pressures (Kreiser et al., 2013). RBT emphasises firm specific capabilities or competencies and resources in strategy formulation and implementation as the fundamental determinants of firm performance (Parnell 2007; Teece 1984; Teece et al., 1997). The firm's valuable, rare, inimitable and sustainable resources are the source of competitive advantage (Barney 1991). Competitive advantage thus results from a firm using these rent-generating resources and matching them with the external environment to generate above-average profits (Wernerfelt 1984). Argued from RBT, firm innovativeness and the outputs of the innovation process are regarded as valuable resources and sources of sustainable competitive advantage in the market and hence commercial success (Harmancioglu et al., 2009). Innovation therefore enhances an SME's ability to adapt to changing market conditions by, for example, introducing new products and services not only to address current and emerging market needs but also to enter new markets that may represent "better strategic fit for their innovation-based capabilities" (Kreiser et al., 2013: 276).

Dynamic capabilities extend RBT thinking (Caloghirou et al., 2004) to explain why some firms sustain competitive advantage in rapidly changing environments (Eisenhardt & Martin, 2000). According to Teece et al. (1997: 517), dynamic capabilities reflect the "firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments. Dynamic capabilities thus reflect an organisation's ability to achieve new and innovative forms of competitive advantage". Seen from this perspective, not only does the innovation itself enhance firm performance because of increased competitiveness, but the innovation process also transforms the firm's internal capabilities, making it more adaptive to change (Love, Roper & Du, 2009). Geroski and Machin (1993: 35) state that "the process of innovation ... transform firms in some way that give[s] rise to what look like generic differences between innovators and non-innovators [in that] innovating firms seem to be much less sensitive to cyclical shocks".

Firm innovativeness could therefore be regarded as a dynamic capability. The performance robustness of innovating firms is related to their innovative capability, which result from, among other things, their architectural competence. Architectural competence refers to the firm's ability to access and integrate a variety of knowledge and expertise (Henderson & Clark, 1990). Henderson and Cockburn (1994: 65) use the term architectural competence to include, what others have called; "capabilities, integrative capabilities, dynamic capabilities, implicit/social or collective knowledge,

organizational architecture, combinative capabilities, managerial systems and values and norms, and invisible assets.”

In summary, SME strategy influences the configuration of internal resources, and firm structures and routines, making the firm more responsive to its external environment by purposefully stimulating innovation activity (Harmancioglu et al., 2009; Love et al., 2009). Resulting innovation is a source for competitive advantage, which in turn leads to above average firm performance. The process of innovation uses and strengthens the dynamic capabilities of the firm, making its performance more robust in its dynamic competitive environment (Geroski & Machin, 1993). This study therefore proposes that innovative SMEs will be more successful than non-innovators in that both the product of innovative activities making the firm more competitive, as well as the process of innovation enhancing and transforming the firm’s internal capabilities, positively impact on performance (Neely & Hii, 1998). These theoretical arguments are supported by empirical findings that say innovation positively influences SME performance (Baldwin & Gellatly, 2003; Bhaskaran, 2006; Dibrell, Craig & Neubaum, 2014; Goudis et al., 2003; Hoffman et al., 1998; Hull & Rothenberg, 2008; Klomp & van Leeuwen, 2001; Mansury & Love, 2008; Prajogo, 2006; Roper, 1997; Roper et al., 2002). Questions remaining unanswered will be elaborated on in the next sections: Does innovation breadth lead to performance improvement or are performing SMEs engaged in more diverse innovating activities? Does increased innovation breadth benefit or harm resource strapped SMEs in that they may overextend their capabilities in innovating too broadly? If diminishing returns of innovation breadth are evident, how persistent is this effect within a five year timeframe?

### **3.3 Reciprocity in the Innovation Breadth – Performance Relationship**

While the positive link between innovation and performance seems apparent from extant literature, the directionality of this relationship remains arguable in an area with an abundance of cross-sectional studies. The reciprocal innovation – performance relationship for large firms has been widely debated among scholars (e.g. Geroski & Machin 1993; Harmancioglu et al., 2009) to the extent that it seems clear that past success alone is not the only predictor of future innovative activity. Accordingly, Bhattacharya and Bloch (2004) find that neither lagged firm growth nor the profitability of Australian firms in high-technology industries significantly influences successive innovation activity. This is contrary to the findings of Audretsch (1995) who finds that both increased profitability and growth were conducive with subsequent innovation in high-tech U.S. industries. Rubera and Kirca (2012) similar finds in a large meta-analysis (153 studies) indicating



that prior performance positively influences subsequent innovativeness. The decision process theory of innovation explains this anomaly differently, proposing that organisations launch innovations following performance below the aspiration level (Greve, 2003). Accordingly, firms facing some problems (including lower than expected performance) trigger the initiation of innovation activities in search of a solution by taking account of the substantial financial risks associated with innovation. The saying that “necessity is the mother of invention” seems to apply (Wiklund & Shepherd, 2005: 72). Firm success, in contrast, may impact negatively on innovation propensity leading to organisational complacency and inertia. This does not imply that firm success is negatively correlated with innovation, on the contrary, it rather suggests that: “success suppresses innovation more effectively than failure spurs innovation” (Greve, 2003: 103) and that past performance may either “breed further innovation or simply complacency” (Bowen et al., 2009: 1184). Emanating from this debate, the link and associated mechanisms between prior firm performance and subsequent innovation, especially among SMEs, thus require further clarification.

This study argues that the innovation breadth – performance relationship may be viewed as a continuing cycle in that firm performance influences innovation which in turn influences future performance. Returning to RBT, resources developed as a consequence of the innovation process and the actual innovation itself are used to create competitive advantage, which in turn may lead to superior performance. Completing the cycle, firms that exhibit superior performance have been found to reinvest in innovation to sustain their competitive advantage (Bowen et al., 2009). The innovation – performance relationship are therefore characterised by different feedback loops or reversed causalities (Rubera & Kirca, 2012). At the level of the SME, the innovation process and products of innovation could be viewed as generators of resource slack, following subsequent performance improvement. Such resource slack could enhance SMEs’ ability to engage in broader innovation activities. Clarity on the exact nature of the innovation – performance relationship can only be found within a longitudinal study design as used in this study (Bowen et al., 2009). It is argued that cross-sectional survey research cannot prove causality, in clarifying if “innovators were more likely to grow, or if growing firms were more likely to innovate” (Freel & Robson, 2004: 562). Therefore, it is hypothesised that:

*Hypothesis 1a: Innovation breadth persistently leads to improved SME performance one year after implementation.*

*Hypothesis 1b: SME performance improvement persistently leads to increased innovation breadth one year after.*

### **3.4 The Curvilinear Innovation Breadth – Performance Relationship**

Another aspect of the relationship between innovation and performance that warrants attention is its linearity. The research discussed above essentially implies that more innovation will infinitely be better for firm performance, that is, if firms innovate across a wider range of business activities, they would be more successful. Entrepreneurs and practitioners are therefore encouraged to broaden the scope of their innovation strategies (Kanter, 2006). Recently, Gunday et al. (2011: 672) recommended that firms endowed with resources, should “encourage and implement a high level of innovation activities” to improve performance. However, the effects of innovation are more complex (Wolff & Pett, 2006). It is doubtful that this would be the case for SMEs. Although specifically, product innovation provides SMEs with a potential competitive advantage in markets where scale effects are not yet in force (Nooteboom, 1994), it is not clear if broader innovation efforts would affect performance similarly. Innovation increases the probability of success but does not guarantee it (Coad & Rao, 2008).

Innovating is a risky business, especially for resource strapped SMEs because they take a proportionately larger risk in innovating than larger businesses. SMEs have to devote a significant proportion of their resources to the innovation task and thus imperil their survival should the introduced innovation fail to deliver a return on their investment (Rosenbusch et al., 2011). It is therefore argued that the innovation breadth – performance relationship may not be linear in nature. SMEs that exhibit larger innovation breadth may not necessarily exhibit higher performance. Due to resource constraints, coupled with the potential disastrous effect of innovation failure, SMEs may be better off to focus their innovation effort rather than endeavouring to innovate across a broad range of business activities at any given time. This conjecture is confirmed in a recent study by Roxas et al. (2014: 449) who find support for an inverted U-curve suggesting “finite positive effects of innovation on the firm’s overall performance outcomes”. It is therefore hypothesised that:

*Hypothesis 2: The innovation breadth – performance relationship is curvilinear, represented by an inverted U-shape; implying that diminishing returns to SME performance with greater innovation breadth are experienced beyond an optimal point.*

### **3.5 The Dynamic Relationship of Innovation Breadth with Performance: Lag and Trajectory**

Two questions concerning the dynamic nature of the innovation – performance relationship remain unanswered. First, empirical evidence is still divided on the extent of the time lag between

implementation of innovations and the resultant performance effects. Research suggest that there may be substantial lag between successful innovation implementation and subsequent firm performance in that the effects thereof may not be immediate, but would only manifest over a number of years (Coad & Rao, 2008). Freel (2000) believes that occasional innovators would have to wait years for profit benefits, whereas intrinsic innovators, with perennial innovative investment, would have to wait even longer. More specific timeframes for such performance lags are however elusive. Most innovation research into the specific types of innovations' relationship with either growth or performance, or both, derive contradictory results (Freel & Robson, 2004; Uhlaner et al., 2013; Varis & Littunen, 2010; Wolff & Pett, 2006).

The dependent variable in this study includes both measures of growth and performance, with the independent variable comprising most types of innovations. It is therefore argued that innovation breadth would in the aggregate immediately affect SME growth and performance positively in that potential profit sacrifices owing to initial innovation investments would be offset by increased firm (sales) growth. Similarly, the aggregate innovation breadth proxy would offset the impact that different types of innovation may have on growth versus performance, which may also differ among industries. Innovation breadth measures improvements to existing or new to the firm products, services, manufacturing processes, managerial processes and marketing activities. Most of these improvements or new to the firm innovations would not be breakthrough, radical and disruptive innovations, which SMEs do not normally have the capacity to develop and commercialise on their own. The argument of persistent payback lag would thus not be observed. Although innovation is relatively more risky for SMEs than larger incumbents, and that overextending innovation breadth may be detrimental (as hypothesised above), the average effect of SME innovation breadth on performance is argued to be more immediate. With increased competition, greater diffusion of information and shorter product life cycles, innovative efforts require immediate performance returns to not only compensate for the innovation investment but also to generate resources required to continue innovating in a quest to remain competitive. It is therefore hypothesised that:

*Hypothesis 3a: The positive relationship of innovation breadth with SME performance is most pronounced and more immediately evident within one year after implementation of the innovations. The performance impact of innovation is therefore not associated with lengthy time lags.*

The second matter that requires further investigation relates to the nature and persistency of the effect that innovation has on future performance. If a positive aggregate relationship is observed, would this effect increase or decrease over time and how persistent would it be? Directly related to

this matter is the question as to whether SMEs should engage in continual or intermittent innovation activities. Geroski, Van Reenen and Walters (1997: 33) respond by asking: “How persistently do firms innovate?” to which they conclude that very few innovative firms innovate persistently. In supporting this finding, Love et al. (2009: 432) refer to the persistent innovation argument as the “conveyor belt” hypothesis. Innovation causes disequilibrium, followed by subsequent equilibrium initiated by imitative market forces (Chanaron & Metcalfe, 2007). Accordingly, innovation activity in SME’s is viewed as intermittent rather than continual. Although this study does not look at the persistency in innovative activity of SMEs, the nature of the relationship between innovation breadth and SME performance over a four year period might provide clues as to the comparative benefits of erratic *versus* continual innovation. Rather than asking how persistent SMEs innovate, this study asks: Should SMEs innovate persistently.

Roberts (1999) argues that the introduction of valuable innovations lead to temporary monopoly positions in the market which is sustained only when innovation is repeated in line with Schumpeterian (1934) thought. This is especially true for product innovations, where a continual stream of new products is required for maintaining sales growth in that it counters increased competition given decreasing product life cycles (Löfsten, 2014). Schumpeter (1950) argues that at the heart of capitalism rests its internal dynamics of revolutionary change based on intense technological and organisational innovation. He believed that entrepreneurs bring the radically new into the capitalist system through their innovation efforts. The process of creative destruction involves a constant search by entrepreneurs to create something new which simultaneously destroys the old rules and establishes new ones for deriving monopolistic profits (Agarwal, Audretsch & Sarkar, 2007). These profits or entrepreneurial income are derived as a consequence of departing from the existing equilibrium, forming the basis for the competitive edge. Schumpeterian monopoly profits derived in this manner diminish over time because of increased competition, which creates the impetus for a new creative destruction process to emerge, accentuating that capitalism consists of change and cannot be analysed as static. Firms reinvent themselves in their quest to remain competitive, wiping out the quasi rents of existing competitor innovations, and ensuring sustainable firm performance. To make this claim, this study uses Roberts’ (1999) development of Schumpeterian thinking that sustained SME performance would result from repeated introductions of new innovations as the performance effects of past innovations decrease. It is therefore hypothesised that:

*Hypothesis 3b: The performance effects of innovation breadth weaken over time.*

### **3.6 Data and Analyses**

The ABS's business longitudinal survey (ABS 2009) is released through a confidentialised unit record file (CURF) comprising two independent samples (referred to as panels) drawn from the Australian business population. The statistics included in this study were taken from Panel Two, containing the latest available data with a completed set of five reference periods (2005-06, 2006-07, 2007-08, 2008-09 and 2009-10). These reference periods are referred to in this study as 2006, 2007, 2008, 2009 and 2010, using the end or data collection point as reference. The Panel Two sample includes 3,432 businesses that were selected from a survey frame of 1,336,515 businesses, created in June 2006 (ABS, 2011). To ensure that the data were suitable for the study, restrictions were imposed in that only employing business were selected. While non-employers may involve personal service providers who obtained an Australian Business Number solely for tax purposes, they do not represent trading businesses in the traditional sense but rather quasi-employees or subcontractors. The final sample size comprised 2297 SMEs. Only businesses employing fewer than 200 employees were included in the panel after additional restrictions were placed on firms operating in the public, education and health industries (ABS, 2011). Panel Two data contained in the CURF were analysed by submitting requests in SPSS syntax format online via the ABS's Remote Access Data Laboratory.

Pearson product-moment correlations were used to test two-way relationships between the main dependent and independent variables included in the hypotheses. Linear and quadratic multiple regressions were used to test the hypotheses presented above. Scale reliability was tested using Cronbach's Alpha. Variance Inflation Factor (VIF) analysis was used and indicated no multicollinearity that would violate assumptions for the linear models tested. VIF values for the linear regression models ranged from 1 to 2.244. As expected, the values for the quadratic regressions ranged between 5.07 to 6.737 for the innovation breadth and innovation breadth squared variables, with controls ranging between 1.066 and 2.25 for these models, hence not exceeding the acceptable threshold of 10 (Lomax, 1992).

### **3.7 Variables and Controls**

#### **3.7.1 SME Performance**

Empirical research results on the innovation – performance relationship provided mixed evidence in that innovation relates differently to various measures of performance (Freel & Robson, 2004; Lööf & Heshmati, 2006; Mansury & Love, 2008; Roper et al., 2002). The differences in relational

outcomes between innovation and different measures of performance highlight the fact that there seems to be no single measure of performance, which account for all aspects of small firm performance (Ramaswamy, Flynn & Nilakanta, 1993). Using a multi-dimensional construct such as innovation breadth as independent variable in the present study, including both product/service and process innovation, requires the design of a dependent variable that captures most of the benefits derived from the different types of innovation. In general, product innovations are associated more with sales growth whereas process innovations are mostly associated with efficiency gains (Hervas-Oliver, Sempere-Ripoll & Boronat-Moll, 2014). As alluded to earlier, the nature of these relationships is ambiguous. Wolff and Pett (2006) for example find a positive relationship between product innovation and manufacturing SME growth, but agree with Freel and Robson (2004) that process innovation does not have a positive effect on SME growth. Uhlaner et al. (2013) find the exact opposite effect and argue that it is process innovation, not product innovation, that drives SME growth. To complicate matters even further, Varis and Littunen (2010) find that product, process and market innovations relate positively to SME growth, but have no effect on SME profitability.

As a consequence of the uncertainty and contradictions in empirical findings, both performance and growth variables are included in this study to ensure that all effects of the different forms of innovation are captured and reflected. The composite index used in this study is similar to the dependent variable operationalised in Gronum et al. (2012) as presented in Study Three in Chapter Four of this thesis. This thesis therefore uses a composite index to measure both effectiveness (product and sales growth) and efficiency (productivity and profitability improvement) of SME performance (Caloghirou et al., 2004; Mansury & Love, 2008; Subramanian & Nilakanta, 1996). For each of the variables, respondents to the BLD were asked if the variable decreased, stayed the same or increased compared to the previous year. Responses were recoded to reflect a value of zero (0) if it decreased, one (1) if it stayed the same and two (2) if it increased. Higher aggregated growth and performance values therefore represents higher relative performance with a range of zero (0) to eight (8). The validity of founder-reported performance measures incorporating broader categories including growth, productivity, and profitability is well established (Liao & Rice, 2010). Although some precision of measure is sacrificed, it is a more suitable measure given the multidimensional nature of innovation breadth. Self-reported measures have also been found to highly correlate with objective measures of performance (Dess & Robinson, 1984). Cronbach's Alpha for SME performance as dependent variables exceeds 0.761 for all of the reference periods, confirming scale reliability (Table 3.2). The performance measures' frequency statistics for the 2006 to 2010 data points are provided in Appendix B.

### 3.7.2 Innovation breadth

The theoretical foundations of ‘innovation breadth’ as innovation typology were discussed at length in Sub-sections 3.1.1 and 3.1.2. The 14 measures were categorised as four groups of innovation types that were combined into a single composite measure of innovation breadth (Bhattacharya & Bloch, 2004; Laursen & Salter, 2006), as depicted in Table 3.1. The reference years in which the different measures were available for inclusion are also indicated. The descriptive statistics for the different years under review (Table 3.2) indicate relatively low levels of innovation breadth among SMEs within the sample (low means and small variation) given maximum potential values of 11 (for 2006 to 2008) and 14 (for 2009 and 2010). Cronbach’s Alpha values range from 0.704 to 0.784 — well above accepted levels for scale reliability (Table 3.2). Frequency statistics for the innovation breadth measures used in all data points are provided in Appendix B.

**Table 3.1 Innovation Breadth Measures**

<b>Dichotomous Innovation Breadth Measures (0 = No or 1 = Yes)</b>	2006 to 2008	2009 and 2010
<b>Business introduced any new or significantly improved goods or services</b>		
Goods	✓	✓
Services	✓	✓
<b>Business introduced any new or significantly improved operational processes</b>		
Methods of manufacturing or producing goods or services	✓	✓
Supporting activities for business operations	✓	✓
Other operational processes	✓	✓
<b>Business introduced any new or significantly improved organisational/managerial processes</b>		
Knowledge management processes	✓	✓
Major change to the organisation of work	✓	
New business practices for organising work procedures		✓
New methods of organising work responsibilities and decision making		✓
Other organisational/managerial processes	✓	✓
<b>Business introduced any new or significantly improved marketing methods</b>		
Changes to the design or packaging of a good or service	✓	✓
New media or techniques for product promotion		✓
Sales or distribution methods (including methods of product placement or sales channels)	✓	✓
New methods of pricing goods or services		✓
Other	✓	✓

### **3.7.3 Control variables – The innovation context**

All the hypothesised relationships in this study are context dependent (Rosenbusch et al., 2011). To obtain unbiased estimators for the effects of the independent variables, contextual factors such as firm age, firm size, industry, market concentration, and relative market share are included as controls for both the linear and curvilinear innovation – performance relationships.

#### ***Firm age***

It is important to control for the effect of firm age on the innovation breadth – performance relationship (Löf & Heshmati, 2006). Firms tend to accumulate more knowledge and experience necessary to innovate over time (Cohen & Levinthal, 1990). In this process, younger firms tend to devote more resources to innovation than large and older firms in their quest to build more innovative capacity (Klomp & van Leeuwen, 2001). Older firms may also have acquired more resources and tend to be larger than their newer rivals thus leading to greater economies of scale in innovation activities. Therefore, older firms are more likely to benefit immediately from innovation. Rosenbusch et al. (2011) postulate a second argument, that the nature of the firm's resources are more important than the quantity. They state that the nature of the firm's resources changes over time from less specialised, more flexible in new organisations to more specialised, less flexible in older established SMEs. They also suggest that older firms are less adaptable owing to engrained routines and core rigidities. It is therefore argued that younger SMEs are more nimble, flexible and adaptable than more established SMEs, and therefore more likely to innovate. Age is measured by the number of years the business has been in operation regardless of changes in ownership as measured at the commencement of the panel data in 2006. Four dummy age variables were created to classify employers as being less than five years old, between five and less than 10 years old, between 10 and 19 years old, and more than 20 years old. The SMEs' less than five years old dummy variable was used as the reference group and thus omitted from the regression analyses to avoid over-determination of the models tested.

#### ***Firm size***

Firm size as a determinant of innovation has become one of the most studied variables (Becheikh, Landry & Amara, 2006; Raymond & St-Pierre, 2010). Authors such as Audretsch (1995) have found larger firm size to be negatively related to innovation, and a number of other studies that have found “negative, not significant, bell-shaped or U-shaped relationships” (Becheikh et al., 2006: 652). However, the majority view supports Schumpeter's (1950) assertion that larger firms tend to not only innovate more, but also benefit more from innovation (Camison-Zornoza et al., 2004).



Greater innovation propensity of larger firms has also been confirmed in an Australian context (Bhattachaya & Bloch, 2004). It is therefore imperative to control for the effects of firm size. Three interval variables were created from the data to differentiate between SMEs employing less than five, between five and 19 as well as 20 to 199 employees. The smallest employees were used as the reference group.

### ***Market concentration and relative market share***

Market concentration influences the speed with which transient quasi rents are eroded away by imitators (Nelson & Winter, 1982). The absence of competition and its associated high rates of return in the industry shelter innovating firms from competitive imitators that do not carry the costs and risks associated with innovative activities (Schumpeter, 1950). As such, innovation creates barriers to entry which in turn increases market concentration (Malerba & Orsenigo, 1996). It is arguable if this would be applicable to SMEs. Critics of Schumpeter argue that a lack of competition may reduce the innovation propensity of firms with the advent of complacency (Bowen et al., 2009; Greve, 2003). Similarly, Acs and Audretsch (1988) find that innovation tends to decrease as the level of concentration rises. As a result of these incompatible views, the effect of a market concentration on the relationship between innovation and firm performance is not clear so that the results of empirical findings are mixed (Bhattacharya & Bloch, 2004; Becheikh et al., 2006; Tingvall & Poldahl, 2006). Market concentration at the industry level measures the number and size distribution of firms in each industry and is most commonly expressed as the market share held by the three or four largest firms in an industry (Caloghirou et al., 2004). Market concentration in this study is measured at the small firm's competitive environment level and is defined as the relative strength of competition within the specific market segment/s or immediate competitive environment/s of the SME. It therefore differs from overall industry concentration. Given their size, SMEs do not normally compete industry-wide, but tend to focus on a niche within the industry (Porter, 1980). SMEs may operate in highly concentrated industries but, at the same time, shield themselves from intense monopolistic competitive pressure as a consequence of their geographic position or niche strategy (introducing innovative products, services, processes, or business models specifically tailored to an attractive niche). Caloghirou et al. (2004) confirm this and find a small but significant effect of industry concentration on small firm profitability. This means that SMEs occupy isolated niches and maintain profitability despite the monopoly power of market leaders. Market concentration at the firm level will be measured in this study as a function of the number of competitors the focal firm compete with and the SME's relative market share within its immediate competitive environment. The number of the competitor scale included: no competition, one or two

competitors, and more than three competitors for each of the five reference periods. Relative market share was ranked on a categorical scale of less than 10 per cent, between 10 and 50 per cent, and more than 50 per cent. The market share variable was only recorded for 2006 and 2007. The 2007 variables were used as control for regressions containing independent variables of later periods. It is expected that greater competition and larger market share will result in SMEs deriving greater performance benefits from their innovation breadth.

### ***Industry***

The industry sector context has been shown to influence the innovation breadth – performance relationship differently (Deschryvere, 2014; Uhlaner et al., 2013). Four industry dummy variables were created by categorising the ANZSIC industry divisions as follows:

Primary industries (agriculture, forestry and fishing as well as mining); manufacturing and construction industries (manufacturing and construction); retail sector (wholesale and retail trade as well as accommodation, cafes and restaurants); and services industries (transport and storage, communication services, property and business services, cultural and recreational services as well as personal and other services).

The four newly created industry categories represented, in the above order, 25.73, 20.42, 24.42 and 29.43 per cent of the valid responses in the sample. The primary industry dummy variable was used as the reference group.

## **3.8 Results and Discussion**

### **3.8.1 The reciprocal innovation breadth – SME performance relationship**

Results suggest that innovation matters for Australian SMEs. Positive, highly statistical significant (all at  $p < .001$  levels) correlations exist between these two variables (Table 3.2) for all five data points. Multivariate ordinary least squares regression analysis confirmed the significant positive relationships in both directions (Table 3.3 and Table 3.4). These symbiotic relationships are robust in both directions with a one-year lag built into the longitudinal design of the models tested (Audretsch, 1995). All the relationships for each of the four models under review are statistically significant, confirming Hypotheses 1a and 1b. This also presents evidence for the persistency of this reciprocal relationship, confirming Laursen and Salter's (2006) argument that previous experience dictates future behaviour and past success conditions it. Bowen et al. (2009) explain this in stating

that superior performance leads to SMEs reinvesting in innovation to sustain their competitive advantage. No evidence was found in this study that firm success may influence innovation negatively because of organisational complacency and inertia, or because innovations are launched following performance below aspiration levels (Greve, 2003). The positive reciprocal relationship was confirmed within the limits of the one-year longitudinal model design presented in this study but the effect seems to be robust beyond one year as evident from the correlations coefficients. Table 3.2 shows highly significant correlations in both directions with up to a four-year lag between observations. The positive innovation breadth – performance relationship with a lag of four years is also confirmed in the quadratic regression results (Table 3.5 and Table 3.6). Accordingly, innovation breadth significantly relates positively to SME performance even up to four years after its introduction.

It has to be noted though that the effect sizes, measured by the coefficients of multiple determination ( $R^2$ ), are low. The highest adjusted  $R^2$  for the innovation breadth (recorded in 2006) and performance (recorded in 2007) relationship was 0.109 (Table 3.3). Likewise, the highest adjusted  $R^2$  for the performance (recorded in 2009) and innovation breadth (recorded in 2010) relationship was 0.091 (Table 3.4). Although all models were statistically significant, the small explanatory powers of these results imply that innovation breadth (controlled with contextual variables) explains only about 11 per cent of subsequent SME performance (or the variability of the response data around its mean). Even a small effect size would be deemed substantively significant when considering the following two factors: first, the large sample represented both innovating and non-innovating SMEs across all sectors. Non-innovating SMEs represent the largest portion of the valid responses recorded for all five data points ('06 = 55.8%; '07 = 63.2%; '08 = 59.2%; 09 = 65.1%; and '10 = 61.8%). Second, as stated *supra*, other than the tested independent variables, a very large number of factors impact on and determine firm performance.

**Table 3.2 Descriptive Statistics, Cronbach's Alphas and Pearson's Coefficients**

		Freq	N	Mean	Std. Dev.	Alpha	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	PERF '06		1993	3.989	2.604	.797	1																				
2	PERF '07		1860	4.172	2.546	.797	.378 ***	1																			
3	PERF '08		1603	4.058	2.418	.762	.304 ***	.369 ***	1																		
4	PERF '09		1459	3.556	2.342	.761	.167 ***	.206 ***	.313 ***	1																	
5	PERF '10		1387	3.666	2.358	.785	.186 ***	.202 ***	.283 ***	.395 ***	1																
6	INNBR '06		2017	1.158	1.742	.729	.269 ***	.231 ***	.196 ***	.161 ***	.134 ***	1															
7	INNBR '07		1877	0.919	1.558	.724	.199 ***	.269 ***	.259 ***	.176 ***	.172 ***	.472 ***	1														
8	INNBR '08		1721	0.933	1.529	.704	.183 ***	.197 ***	.31 ***	.166 ***	.204 ***	.394 ***	.457 ***	1													
9	INNBR '09		1610	0.986	1.810	.781	.166 ***	.176 ***	.23 ***	.23 ***	.22 ***	.373 ***	.416 ***	.52 ***	1												
10	INNBR '10		1518	1.024	1.854	.784	.159 ***	.18 ***	.226 ***	.2 ***	.252 ***	.323 ***	.373 ***	.46 ***	.522 ***	1											
11	Size 0 to 4 '06	879	2052	0.428	0.495		-.228 ***	-.189 ***	-.155 ***	-.148 ***	-.121 ***	-.195 ***	-.182 ***	-.206 ***	-.193 ***	-.196 ***	1										
12	Size 5 to 19 '06	679	2052	0.331	0.471		.04	.039	.029	.019	.003	.063 **	.022	-.001	.039	.042	-.609 ***	1									
13	Size 20 to 200 '06	494	2052	0.241	0.428		.219 ***	.174 ***	.141 ***	.146 ***	.133 ***	.156 ***	.183 ***	.234 ***	.175 ***	.175 ***	-.487 ***	-.396 ***	1								
14	Age 0 to 4 '06	393	2050	0.192	0.394		-.079 ***	.06 *	.042	-.031	-.018	-.023	-.019	-.028	-.005	-.006	.174 ***	-.06 **	-.135 ***	1							
15	Age 5 to 9 '06	386	2050	0.188	0.391		.055 *	.038	.041	.021	-.011	.028	.048 *	.054 *	.025	.036	.026	.023	-.055 *	-.235 ***	1						
16	Age 10 to 19 '06	520	2050	0.254	0.435		.048 *	-.008	-.028	-.019	-.037	.035	-.026	-.018	.016	.006	-.027	-.007	.039	-.284 ***	-.281 ***	1					
17	Age 20 or more '06	751	2050	0.366	0.482		-.024	-.070 **	-.039	.026	.060 *	-.012	-.002	.011	-.031	-.014	-.139 **	.037	.121 **	-.370 **	-.366 **	-.443 **	1				
18	DIV 1 and 2 Primary	591	2297	0.257	0.437		-.18 ***	-.207 **	-.137 **	-.129 **	-.084 **	-.140 **	-.107 **	-.136 **	-.115 **	-.134 **	.155 **	-.043	-.132 **	-.054 *	-.066 **	.01	.089 **	1			
19	DIV 3 and 5 Man. & Con.	469	2297	0.204	0.403		.091 ***	.054 *	.045	.052 *	.037	.044 *	.029	.056 *	.055 *	.057 *	-.056 *	-.003	.068 **	-.008	.043	-.037	.005	-.298 **	1		
20	DIV 6, 7 and 8. Retail	561	2297	0.244	0.430		.088 ***	.092 **	.070 **	.095 **	.089 **	.061 **	.052 *	.061 **	.057 **	.060 **	-.125 **	.077 **	.060 **	-.007	-.011	.006	.01	-.335 **	-.288 **	1	
21	DIV 9 to 17 Services	676	2297	0.294	0.456		.012	-.066 **	.028	-.011	-.037	.037	.028	-.024	.009	.022	.016	-.027	.011	.066 **	-.037	.017	-.100 **	-.380 **	-.327 **	-.367 **	1

PERF: Performance. INNBR: Innovation Breadth. DIV: ANSIC Industry Divisions. Correlations are significant at the \*p < .05, \*\*p < .01, and \*\*\* p < .001 levels (two-tailed).

**Table 3.3 Linear Regressions for Innovation Breadth '06 to '09 and Performance '07 To '10, Including Controls**

	Performance 2007			Performance 2008			Performance 2009			Performance 2010		
	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.
Constant	2.756***	0.256	0.000	2.954***	0.267	0.000	2.967***	0.326	0.000	3.908***	0.346	0.000
Inn. Breadth '06	0.238***	0.034	0.000									
Inn. Breadth '07				0.308***	0.040	0.000						
Inn. Breadth '08							0.149**	0.044	0.001			
Inn. Breadth '09										0.206***	0.037	0.000
Size 5 to 19 in '06	0.391**	0.140	0.005	0.613***	0.143	0.000	0.5**	0.162	0.002	0.305	0.166	0.066
Size 20 to 199 '06	0.904***	0.159	0.000	0.738***	0.165	0.000	0.838	0.184	0.000	0.881***	0.190	0.000
Age 5 to 9 '06	-0.248	0.194	0.202	-0.177	0.200	0.376	-0.086	0.233	0.711	-0.233	0.244	0.340
Age 10 to 19 '06	-0.572**	0.179	0.001	-0.397*	0.184	0.031	-0.187	0.209	0.371	-0.333	0.221	0.132
Age 20 or older '06	-0.733***	0.171	0.000	-0.469**	0.175	0.007	-0.161	0.200	0.420	-0.064	0.209	0.759
Competitors '06	0.237**	0.088	0.007	0.075	0.088	0.396	-0.148	0.097	0.126	-0.268**	0.100	0.007
Market Share '06	0.194*	0.091	0.034	0.225*	0.095	0.018	0.165	0.108	0.127	-0.082	0.109	0.450
IND: DIV 3 and 5	0.75***	0.175	0.000	0.448*	0.178	0.012	0.537**	0.199	0.007	0.3	0.208	0.149
IND: DIV 6 7 and 8	0.889***	0.171	0.000	0.438*	0.176	0.013	0.586**	0.199	0.003	0.432*	0.206	0.036
IND: DIV 9 to 17	0.813***	0.162	0.000	0.417*	0.165	0.012	0.344	0.189	0.069	0.099	0.198	0.617
<i>N</i>	1475			1475			1157			1097		
<i>R</i> <sup>2</sup>	0.115			0.101			0.063			0.072		
<i>R</i> <sup>2</sup> Adjusted	0.109			0.094			0.054			0.063		
<i>F</i> Statistics	19.277***			14.933***			6.963***			7.708***		

Size: SMEs with less than 5 employees is the baseline age variable. Age: SMEs less than 5 years in operation is the baseline age variable. IND DIV: ANSIC Industry Divisions. DIV 3 and 5: Manufacture and construction. DIV 6, 7 and 8: Retail. DIV 9 to 17: Services. The primary industry (DIV 1 and 2, agriculture and mining) is the baseline industry variable. Unstandardized regression coefficients are reported. Inn. Breadth: Innovation Breadth. Correlations are significant at the \**p* < .05; \*\**p* < .01; and \*\*\**p* < .001 levels (two-tailed).

**Table 3.4 Linear Regressions for Performance '06 to '09 and Innovation Breadth '07 to '10, Including Controls**

	Innovation Breadth 2007			Innovation Breadth 2008			Innovation Breadth 2009			Innovation Breadth 2010		
	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.
Constant	-0.06633	0.164	0.685	-0.074	0.169	0.663	-0.363	0.279	0.193	-0.480	0.288	0.096
Performance '06	0.086***	0.015	0.000									
Performance '07				0.065***	0.016	0.000						
Performance '08							0.138***	0.023	0.000			
Performance '09										0.11***	0.025	0.000
Size 5 to 19 in '06	0.283**	0.088	0.001	0.416***	0.088	0.000	0.455***	0.129	0.000	0.541***	0.134	0.000
Size 20 to 199 '06	0.607***	0.101	0.000	0.866***	0.101	0.000	0.941***	0.144	0.000	1.016***	0.152	0.000
Age 5 to 9 '06	0.089	0.122	0.465	0.177	0.124	0.153	0.004	0.184	0.983	-0.022	0.197	0.911
Age 10 to 19 '06	-0.179	0.113	0.115	-0.009	0.115	0.937	-0.024	0.166	0.886	-0.121	0.178	0.497
Age 20 or older '06	-0.124	0.108	0.250	-0.022	0.109	0.843	-0.182	0.158	0.250	-0.224	0.169	0.185
Competitors '06	0.164**	0.055	0.003	0.086	0.054	0.111	0.183*	0.076	0.017	0.243**	0.080	0.002
Market Share '06	0.040*	0.058	0.491	0.051	0.058	0.383	0.064	0.085	0.452	0.186*	0.088	0.034
IND: DIV 3 and 5	0.19	0.111	0.087	0.191	0.110	0.083	0.059	0.157	0.705	0.181	0.169	0.286
IND: DIV 6 7 and 8	0.213*	0.108	0.048	0.211	0.109	0.053	0.044	0.156	0.779	-0.034	0.166	0.836
IND: DIV 9 to 17	0.188	0.102	0.066	0.156	0.103	0.129	-0.001	0.149	0.993	0.076	0.159	0.635
<i>N</i>	1712			1571			1192			1088		
<i>R</i> <sup>2</sup>	0.077			0.094			0.097			0.100		
<i>R</i> <sup>2</sup> Adjusted	0.071			0.088			0.088			0.091		
<i>F</i> Statistics	12.844***			14.705***			11.491***			10.869***		

Size: SMEs with less than 5 employees is the baseline age variable. Age: SMEs less than 5 years in operation is the baseline age variable. IND DIV: ANSIC Industry Divisions. DIV 3 and 5: Manufacture and construction. DIV 6, 7 and 8: Retail. DIV 9 to 17: Services. The primary industry (DIV 1 and 2, agriculture and mining) is the baseline industry variable. Unstandardized regression coefficients are reported. Inn. Breadth: Innovation Breadth. Correlations are significant at the \**p* < .05; \*\**p* < .01; and \*\*\**p* < .001 levels (two-tailed).

**Table 3.5 Quadratic Regressions for Innovation Breadth '06 and Performance '07 to '10, Without Controls**

	Performance 2007			Performance 2008			Performance 2009			Performance 2010		
	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.
Constant	3.714***	0.076	0.000	3.667***	0.078	0.000	3.219***	0.081	0.000	3.377***	0.078	0.000
Inn. Breadth '06	0.563***	0.083	0.000	0.496***	0.085	0.000	0.418***	0.087	0.000	0.548***	0.101	0.000
Inn. Breadth <sup>2</sup> '06	-0.042**	0.014	0.003	-0.042**	0.014	0.003	-0.038*	0.015	0.011	-0.058**	0.018	0.001
<i>N</i>	1783			1537			1395			1321		
<i>R</i> <sup>2</sup>	0.058			0.044			0.03			0.021		
<i>R</i> <sup>2</sup> Adjusted	0.057			0.043			0.029			0.019		
<i>F</i> Statistics	55.076***			35.148***			21.822***			14.065***		

Size: SMEs with less than 5 employees is the baseline age variable. Age: SMEs less than 5 years in operation is the baseline age variable. Inn. Breadth: Innovation Breadth. Unstandardized regression coefficients are reported. Correlations are significant at the \**p* < .05; \*\**p* < .01; and \*\*\**p* < .001 levels (two-tailed).

**Table 3.6 Quadratic Regressions for Innovation Breadth '06 and Performance '07 to '10, Including Controls**

	Performance 2007			Performance 2008			Performance 2009			Performance 2010		
	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.	Unst. Coeff. <i>B</i>	Std. Error	Sig.
Constant	2.739***	0.255	0.000	2.731***	0.266	0.000	2.647***	0.272	0.000	3.289***	0.292	0.000
Inn. Breadth '06	0.406***	0.084	0.000	0.371***	0.086	0.000	0.328***	0.089	0.000	0.271**	0.092	0.003
Inn. Breadth <sup>2</sup> '06	-0.031*	0.014	0.027	-0.033*	0.014	0.022	-0.032*	0.015	0.035	-0.023	0.015	0.117
Size 5 to 19 in '06	0.379**	0.14	0.007	0.338*	0.146	0.021	0.32*	0.15	0.034	0.172	0.158	0.275
Size 20 to 199 '06	0.878***	0.159	0.000	0.65***	0.165	0.000	0.702***	0.169	0.000	0.638***	0.18	0.000
Age 5 to 9 '06	-0.25	0.194	0.197	-0.186	0.202	0.358	0.168	0.211	0.425	-0.016	0.223	0.944
Age 10 to 19 '06	-0.583**	0.179	0.001	-0.489**	0.186	0.009	-0.088	0.193	0.65	-0.225	0.207	0.277
Age 20 or older '06	-0.743***	0.171	0.000	-0.533**	0.177	0.003	0.062	0.185	0.738	0.097	0.195	0.618
Competitors '06	0.226*	0.088	0.01	0.204*	0.092	0.026	-0.057	0.092	0.536	-0.048	0.099	0.63
Market Share '06	0.19*	0.091	0.037	0.319**	0.095	0.001	0.044	0.096	0.644	-0.051	0.101	0.613
IND: DIV 3 and 5	0.745***	0.175	0.000	0.381*	0.181	0.035	0.53**	0.186	0.004	0.236	0.196	0.229
IND: DIV 6 7 and 8	0.885***	0.171	0.000	0.418*	0.179	0.019	0.646***	0.184	0.000	0.374	0.193	0.053
IND: DIV 9 to 17	0.797***	0.162	0.000	0.406*	0.169	0.016	0.281	0.174	0.107	-0.016	0.185	0.932
<i>N</i>	1704			1472			1336			1266		
<i>R</i> <sup>2</sup>	0.117			0.081			0.059			0.04		
<i>R</i> <sup>2</sup> Adjusted	0.111			0.073			0.051			0.03		
<i>F</i> Statistics	18.728***			10.697***			6.937***			4.310***		

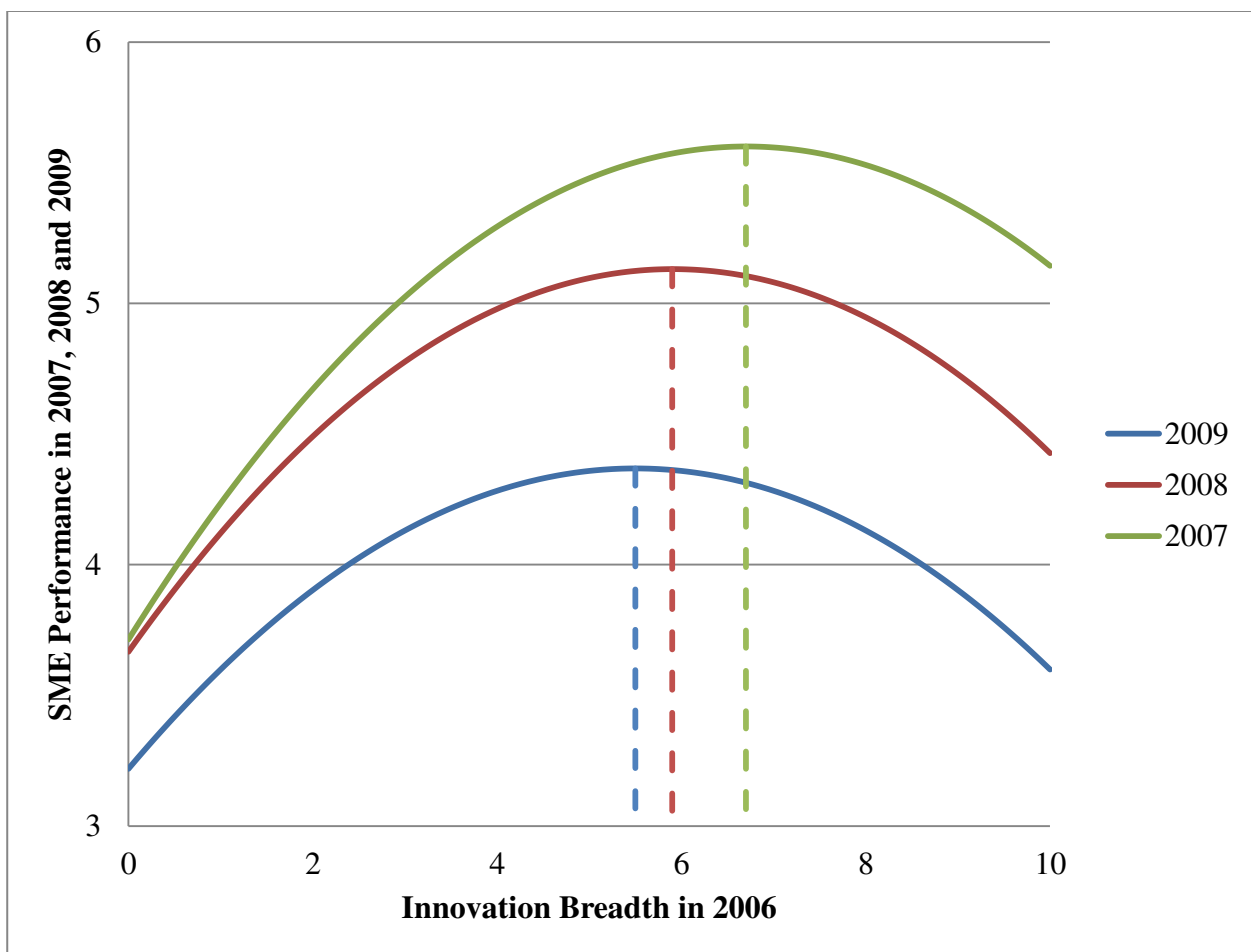
Size: SMEs with less than 5 employees is the baseline age variable. Age: SMEs less than 5 years in operation is the baseline age variable. IND DIV: ANSIC Industry Divisions. DIV 3 and 5: Manufacture and construction. DIV 6, 7 and 8: Retail. DIV 9 to 17: Services. The primary industry (DIV 1 and 2, agriculture and mining) is the baseline industry variable. Unstandardized regression coefficients are reported. Inn. Breadth: Innovation Breadth. Correlations are significant at the \**p* < .05; \*\**p* < .01; and \*\*\**p* < .001 levels (two-tailed).



### 3.8.2 The dynamic, inverted U-relationship of innovation breadth with SME performance

Quadratic regression analysis was applied in testing curvilinearity in the relationship between innovation breadth (recorded in 2006) and subsequent performance (recorded for 2007 to 2010). Results confirm Hypothesis 2, suggesting finite innovation breadth advantages. The results of all of these quadratic regressions were found to be significant, as reported in Table 3.5, when only looking at the relationship between the primary independent variables (innovation breadth and quadratic innovation breadth) and performance, with controls omitted. When controlling for contextual variables (Table 3.6), the quadratic innovation breadth variable remains significant except for the model containing performance recorded in 2010. The statistically significant regression results of the 2007, 2008 and 2009 performance models (Table 3.6) were plotted in Figure 3.1. This further supports Hypothesis 2 by graphically presenting these relationships as inverted U-shapes.

**Figure 3.1 Lagged, Curvilinear Innovation Breadth – Performance Relationships**



The inverted U-shape challenges conceptions of a simplistic, positive linear relationship between innovation breadth and SME performance. The regressions plotted in Figure 3.1, are expressed as:

$$\begin{aligned} \text{SME Performance}'07 &= 3.714 + 0.563(\text{Innovation}'06) - 0.042(\text{Innovation}^2'06); \\ \text{SME Performance}'08 &= 3.667 + 0.496(\text{Innovation}'06) - 0.042(\text{Innovation}^2'06); \text{ and} \\ \text{SME Performance}'09 &= 3.219 + 0.418(\text{Innovation}'06) - 0.038(\text{Innovation}^2'06). \end{aligned}$$

The positive y-axis intercept values can be explained by looking at the manner in which the performance dependent variable is operationalised. The variables used to operationalise SME performance were recoded to zero (0) when the respondent indicated that the firm experienced a decline in the variable, one (1) when it remained the same, and two (2) when there was an increase. It is argued that both maintaining and improving existing levels of performance are positive indicators of firm success. Maintaining sales levels or profitability, as an example, cannot be regarded as a negative outcome because it demonstrates the firm's ability to remain competitive within the competitive market or niche it operates in. As discussed in Section 2.5, this argument is in line with the statement that many SMEs are not interested in growth (Wiklund et al., 2003), implying that maintaining current levels of growth and performance would be regarded in a positive light by SME owners. Maintaining current performance levels does therefore not necessarily result from SME owners' inability or lack of opportunities, but rather reflects their choice not to grow their businesses (Cliff, 1998; Gilbert et al., 2006; Kirkwood, 2009). This explains why SME performance is positive on the y-intercept of the plotted relationships (Figure 3.1). The y-intercepts of the 2007 and 2008 performance curvilinear functions is almost identical (3.714 and 3.667 respectively), but higher than the 2009 model's intercept (3.219). This results from substantially lower average performance levels recorded for Australian SMEs in 2009 (and 2010), and caused by the impact of the global financial crisis (GFC) that led to a clear downturn in demand for goods and services in the fourth quarter of 2008 (OECD, 2009).

The curvilinear relationships clearly illustrate that innovation breadth initially relates positively to SME performance, but that such an effect weakens until an optimal point is reached, after which increased innovation breadth negatively relates with SME performance. This implies that, irrespective of the number of innovations (innovation depth, which is not accounted for), an increase in the diversity of implemented innovation types (breadth) beyond an optimal point, would be associated with negative SME performance. The optimal level of innovation breadth seems to lie just above the mid-range of the full spectrum of potential innovation types, given that the 2006 innovation breadth variable comprises 11 proxies. The plotted relationships are also only plotted up

to an innovation breadth maximum of 10 innovation types as there were no SMEs in the sample that have innovated across the full spectrum of innovation types in 2006.

This inverted U-shape phenomenon could be explained by considering arguments of the evolutionary economics and RBT. Diversity in innovative output improves a firm's ability to adapt to its competitive environment and enhances its growth potential (Nelson & Winter, 1982b). Diverse competencies and resource slack is required for realising greater innovation breadth and resultant competitive advantage (Barney, 2002). The positive link between greater innovation diversity and firm growth is confirmed in this study (Love et al., 2011). In general, SMEs are resource poor and will overextend their capabilities in innovating too broadly. Only when SMEs have grown large enough to accumulate adequate resources and capabilities, would greater innovation breadth be more beneficial.

The consistent significant negative correlations of the smallest SMEs (fewer than five employees) and the significant positive correlations of the largest SMEs (20 to 199 employees) with innovation breadth as well as performance confirm this assertion (Table 3.2). Further support for this is evident after comparing the quadratic regressions in Table 3.5 with the models that include controls in Table 3.6. The addition of controls in the full models lowered the statistical significance levels of the 2006 quadratic innovation breadth variables in the 2007 and 2008 regressions from  $p < 0.01$  to  $p < 0.05$ . The addition of controls also resulted in the 2006 quadratic innovation breadth variable becoming non-significant in the 2010 regression. This indicates potential moderation by controls, of which size seems to have the greatest effect. Larger SME firm size (20 to 199 employees) mitigates the diminishing and negative returns of greater innovation breadth. Using the smallest size category (less than four employees) as a baseline variable in the regression analysis, does not allow observation of its effect. The Pearson correlation observation that the smallest SME size variable consistently correlates negatively with performance does however suggest the direction of the influence of smaller size. The potential risks associated with innovation imply that innovation across a broad spectrum may increase such risks. Uncoordinated and unsuccessful innovations across such a broad spectrum will negatively impact on SME performance. This may also explain the inverted U-shape as to why SMEs that implement less types of innovation can outperform those that implement a larger variety. As Freel and Robson (2004: 570) state, firms failing in their innovative effort "are more likely to perform poorly than those that make no attempt to innovate". The dynamic relationship of innovation breadth with SME performance was also investigated to illustrate the persistent and increasingly negative influence that excessive innovation breadth has on SME performance up to three years after introduction.

Existence of a lagged payback cycle of innovation has been established in the extant literature. The duration of such a cycle ranges from two (Audretsch, 1995) to 10 years (Freel & Robson, 2004) before returns on innovation investment materialise. Although returns to specific innovation investments are not measured in this study, the results suggest that returns from innovation breadth are evident in the near (one-year) term for both the linear (Table 3.3) and quadratic models (Table 3.5 and Table 3.6). Hypotheses 3a and 3b are therefore confirmed. Not only does innovation breadth relates positively with performance in the short term (one-year lag) but such a relationship decreases over time. This is clear from the observation that the explanatory power of the quadratic regression models ( $R^2$ ) weakens substantially over three years after the innovation breadth is introduced. SMEs would therefore be wise to persistently engage in moderate levels of innovation breadth to enhance continued performance. Another interesting observation from Figure 3.1 is that the optimal point at which greater innovation breadth leads to negative returns in SME performance decreases over time as indicated by the vertical dotted lines. This implies that the negative effects of overextended innovation breadth become more pronounced over time. This emphasises that SMEs should rather focus their innovation efforts in limiting its diversity so as to also ensure the longevity of benefits derived. Long-term performance benefits are therefore greater at lower levels of innovation breadth.

Finding an inverted U-shaped relationship does not however refute the arguments that different types of innovation impact otherwise on performance as well as at different rates over time. It must be remembered that the numbers on the x-axis in Figure 3.1 do not represent specific categories of the different types of innovation, but rather count the different types of implemented innovations. It may well be that, as an example, process innovations impact upon performance one year after implementation, whereas product innovations impact upon performance only during later years. Therefore, the continued positive aggregate effect of moderate levels of innovation breadth on performance is maintained, although at lower effect sizes, over the three-year timeframe. Similarly, the different relationship with growth of different types of innovation, as opposed to performance measures could also not be specified as the explained variance is only discerned in the aggregate.

### **3.8.3 SME innovation and performance in context**

Results indicate that the contextual factors do significantly relate to the dependent variables in the regression models (Rosenbusch et al., 2011). Size had the largest effect on the innovation breadth – performance relationships followed by industry, age, number of competitors, and market share. Age negatively relates to SME performance in the linear and quadratic models but is only significant for

SMEs older than 10 years (Table 3.3 and Table 3.6). There are two divergent views on how age affects innovation. Cohen and Levinthal (1990) suggest that older firms will be more innovative as they have accumulated more knowledge and experience over time. Rosenbusch et al. (2011) argue conversely that newly established SMEs are more flexible, adaptable and possess fewer specialised resources, thus making them more likely to innovate. No significant results for age are found in the linear models with innovation breadth as a dependent variable (see Table 3.4). These non-significant findings do not support either the literature, other than to indicate that firm age does not explain the breadth of SME innovation activity.

Regarding firm size, Geroski, Machin and Van Reenen (1993) argue that effective management requires constraints on the amount of strategic variety, implying that innovation breadth relates positively to large firm performance but that excessive breadth may be detrimental to smaller firms. The findings of this study confirm this conjecture as it applies to SMEs with resource constraints (Table 3.6). Larger SMEs tend to innovate more broadly across more diverse business activities as seen in the positive relationship between firm size and innovation breadth (Table 3.4). Larger SMEs can achieve this because they control more resources, spend more on R&D, and generally have a larger market share (Galende & de la Fuente, 2003).

Competition seems to stimulate SME innovation breadth rather than inhibit it as suggested by Schumpeter (1950). This study found evidence of a positive relationship between SMEs' relative market share and innovation breadth (Table 3.4) as well as performance (Table 3.3 and Table 3.6) but only for some of the tested models and at lower levels of significance.

### **3.9 Conclusions**

The contribution of businesses to innovation in the economy is unmistakable (Judd & McNeil, 2008). SMEs total by far the majority of business entities in Australia (ABS, 2010), yet inquiry into the innovation – performance relationship of SMEs is only starting to occur (Rosenbusch et al., 2011). The main factors that remain ambiguous relate to the temporality, linearity and directionality of this relationship (Geroski & Machin, 1993; Harmancioglu et al., 2009; Mansury & Love, 2008). SME owners or managers hear many often contradictory claims as to the value of innovation to their bottom-line. Researchers have rarely considered the breadth of focus of innovations across multiple innovation domains (Love et al., 2011), hence have not understood the higher proportional risks associated with SMEs innovation diversity. This study assessed and clarified the nature of, and dynamics associated with, the innovation breadth – performance relationship. For this reason, a new measure of innovation, 'innovation breadth' is theorised and operationalised to accommodate a

specific dimension of innovation, namely the breadth or diversity of innovation types, implemented across several business activities. This study has argued that innovation breadth more accurately conceptualises the innovation measure used in community innovation surveys that adopt the OSLO Manual's definition of innovation. Using innovation breadth as a measure attempts to remedy the often observed mismatch between the conceptualisation and operationalisation of innovation constructs, which currently plague empirical studies in this field.

This study is not without limitations. One potential problem using historical comparisons in testing performance is the effect of economic or business cycles as was experienced in the recent GFC. Its impact is evident in the mean statistics of the performance measures in 2009 and 2010 presented in Table 3.2. It is very difficult to control for such cyclical fluctuations in the current dataset, hence caution should be exercised when interpreting the longitudinal results, especially for the 2009 and 2010 data points. Another limitation to this study relates to the dichotomous and polytomous nature of the data. Dichotomous questions do not capture much of the depth of the phenomena investigated. While the benefits of yes/no measures are clear in terms of low bias and efficiency, these measures miss some of the complexity involved in the innovation – performance determinants (de Jong & Vermeulen, 2006). The restrictive nature of categorical survey data becomes evident when considering the potential impact of miss-specifying predetermined intervals. Innovation was measured by applying a composite index of innovation types. This measure captures the breadth of innovation but not its depth. Last, the degree of novelty is also not tested.

The existence of mutually beneficial, reciprocal relationships between SME innovation and performance were confirmed. Results consistently show that performing SMEs innovate more broadly and that innovation breadth relates positively with performance given a one-year lag. It seems that innovating firms reinvest in innovation breadth to sustain their competitive advantage. The longitudinal study design captured five observation points with one-year intervals that allows for testing the trajectory of and lags observed in the innovation breadth – performance relationship. The performance benefits of innovation breadth peaks one year after introduction but remains positive for up to four years, albeit with smaller effect sizes recorded every consecutive year. The immediate performance payback attributed to innovation breadth questions the existence of long-time lags (Freel & Robson, 2004). The innovation breadth – performance relationship is indeed more complex than the often hypothesised direct linear relationship and exhibited characteristics of nonlinearity. This relationship is better described by an inverted U-shape. The optimal point in the number of innovation types that SMEs should implement to derive maximum performance benefit from such innovations amounts to around six innovation types or just above half of the potential innovation types that SMEs can implement. The innovation breadth – performance relationship is

highly contextual. Size matters. Larger SMEs tend to innovate more broadly and exhibit higher levels of performance. The results seem to suggest that larger SMEs with more resource slack are less affected by the negative returns associated with overextended innovation breadth. Increased competition and higher relative market share (within the “isolated market niches” occupied by most SMEs) stimulate innovation breadth and are positively related to performance (Caloghirou et al, 2004: 237). It found limited evidence of a negative relationship of age with performance but no evidence for its relationship with innovation breadth.

Does innovation matter? This is the question that should be answered to SME owners as they contemplate the practical costs and risks associated with innovation in the face of competitive pressure and daily management tasks. The answer is plainly, yes! However, there is a caveat. The assumption that every innovation is advantageous is misleading. SMEs should be aware that the non-linear innovation – performance relationship takes an inverted U-shape form. This implies that overextending the range of activities in which innovations are applied can harm SME sustainability in that it relates negatively with performance. Because SMEs are hampered by limited resources and capabilities and thus limited innovation scope, they would derive maximum performance benefits from innovation breadth if they focused their innovative efforts on only crucial business activities. They should refrain from being tempted into innovating across all types of innovation. Continual implementation of moderate levels of innovation breadth would produce and maintain maximum performance benefits, thus ensuring sustainability in the long run.

## **4. STUDY THREE: THE ROLE OF NETWORKS IN SMALL AND MEDIUM-SIZED ENTERPRISE INNOVATION AND FIRM PERFORMANCE**

This chapter presents a published study:

Gronum, S., Verreyne, M., & Kastle, T. (2012). The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. *Journal of Small Business Management*, 50(2), 257-282. The consent of both co-authors was obtained for inclusion of this publication in the thesis. Full acknowledgement of their contributions are provided in the statement of contribution (see page iv). The original article was edited for inclusion in this thesis only to the extent that consistency with the style adopted in this thesis is reflected. © 2012, International Council for Small Business.

### **ABSTRACT**

The objective of this article is to understand the contribution of networks to innovation and firm performance in SMEs. Based on longitudinal data from 1,435 SMEs, we show that strong, heterogeneous ties improve innovation in SMEs. However, the connections between network ties and firm performance are more complex than previously thought, as the positive association is mediated by innovation. Consequently, SMEs should only concentrate on cultivating and maintaining networks if they lead directly to improvements in innovation.

### **4.1 Introduction**

Innovation is vital to advancing living standards and wealth creation. While innovation occurs in many guises, firms play a leading role in creating innovation and translating it into useful applications for the market (OECD, 2010a). Innovation in firms takes place when knowledge is commercialized, for example in the form of new products, services, processes or business models (Baldwin & Gellatly, 2003). Since Schumpeter (1950) suggested that large firms are more likely to innovate than their smaller counterparts, researchers have investigated the relationship between innovation, performance and firm size (Rosenbusch et al., 2011). The investigation of innovation in small and medium enterprises (SMEs) is more recent (Audretsch & Lehmann, 2005) and, although the evidence of a strong correlation between innovation and SME performance is overwhelming (e.g. Baldwin & Gellatly, 2003; Mansury & Love, 2008; Roper et al., 2002), the dynamics of this relationship remain ambiguous.



One explanation can be found in the establishment of networks that play a crucial role in innovation. Social capital can be viewed as all the resources embedded in network relationships of individuals, communities, networks or societies (Burt, 1997; Coleman, 1990; Nahapiet & Ghoshal, 1998). Network research at the firm level is concerned with uncovering the benefits derived from networks measured mostly as economic or financial firm performance (Ozman, 2009). The dominant view in the literature is that networks and the social capital embedded in these relationships are positively associated with innovativeness as well as SME performance (Pittaway, Robertson, Munir, Nenyer & Neely, 2004; van Wijk, Jansen & Lyles, 2008). However, empirical evidence into the relationship between social capital and SME performance is inconclusive in that “research has largely not accounted for the mediating process steps that translate social capital into organizational performance outcomes” (Maurer et al., 2011, p. 157).

Against this background, we investigate the relationships between networks, innovation and performance in SMEs. The use of networks and knowledge sources in stimulating innovation output are typically the focus of open innovation research. Results on the whole show that openness through networking is complementary and beneficial to the innovation outcomes of firms (Laursen & Salter, 2006). Yet as stated above, its direct contribution to SME performance is still controversial when considering the results of network based social capital research (Maurer et al., 2011).

SMEs provide an interesting context for this type of research. The bulk of the research on the impact of both innovation and networks on performance has been undertaken in large firms. In smaller firms, much of the investigation focuses primarily on start-ups (Garnsey, Stam & Heffernan, 2006). However, it is firms that are both small and already established that are significant drivers of economic growth (OECD, 2009). Consequently, it should be useful to develop a better understanding of how networks and innovation contribute to SME performance (Verreyne & Meyer, 2010) to overcome their liability of smallness without diverting time and money from core activities.

Our research aim is therefore to contribute to this special issue by improving our understanding of the organisational and managerial challenges faced by SMEs in utilizing networks for enhancing innovation output and firm performance. We do this by investigating the nature and dynamics of the relationships between networks, innovation and SME performance. First, we investigate the impact of social capital embedded in network relationships on innovation breadth (Leiponen & Helfat, 2010) and SME performance. More specifically, we investigate whether the structural and relational dimensions of social capital embedded in networks enhance greater innovation breadth, firm performance, or both. Second, we place our findings within the SME

innovation literature, where networks have been touted as a solution to resource restrictions, yet the manner in which these firms utilize it as part of an open innovation approach remains contentious (Lee et al., 2010; Lichtenthaler, 2008; van de Vrande et al., 2009). Third, our data (ABS, 2011) were collected at three time points, and by using variables from each of these periods, we address the problem of temporality inherent to cross-sectional studies (Bowen et al., 2010; van de Ven & Poole, 1989).

The paper is organised as follows. We commence with a review of literature relevant to the topic, which leads to the development of a conceptual model and hypotheses in the following section. The research method is outlined next, followed by results, a discussion and discussed, and concluding remarks in the final section. The results show that networking is important to innovation, but question its direct relation to firm performance. They confirm that innovation breadth acts as a mediator, unlocking the firm performance benefits of social capital embedded in networks of SMEs.

## **4.2 Literature Review**

Innovation can be viewed as both an output and a process (Damanpour & Evan, 1984; Salavou & Lioukas, 2003). As an output it is the result of the innovation process, the types of innovation created by a firm, or the actual implementation of the new product, service, business process or method (Love et al., 2009). Innovation also indicates the development and commercial exploitation of a new idea or invention, “the process of innovation refers to the temporal sequence of events that occur as people interact with others to develop and implement their innovation ideas within an institutional context” (van de Ven & Poole, 1989, p. 32). Both the innovation process and the resulting innovation outputs can affect the firm performance of SMEs (Rosenbusch et al., 2011).

To measure this relationship, the Oslo Manual has become the reference for various large scale surveys, including CIS (Community Innovation Surveys) since 1992 when the first edition was published (OECD, 2005). The Oslo Manual definition was also used by the large scale Australian Bureau of Statistics’ (ABS) Business Longitudinal Database (BLD) employed in this study (ABS, 2011). For this reason, we adopt the Oslo Manual’s definition (OECD, 2005, p. 46) of innovation as well:

*“Innovation is the implementation of any new or significantly improved product (goods or services), operational processes (methods of production and service delivery), any new marketing methods (packaging, sales and distribution methods), or new organizational or*

*managerial methods or processes in business practices, workplace organization or external relations”.*

Substantial evidence exists that the innovation process and resulting innovation outputs are important determinants of firm performance, indicating that innovators outperform non-innovating firms (Baldwin & Gellatly, 2003; Goudis et al., 2003; Hoffman et al., 1998; Klomp & van Leeuwen, 2001; Mansury & Love, 2008; Prajogo, 2006; Roper et al., 2002). Various measures for innovation are employed in empirical studies, including innovation breadth which has been shown to underpin firm performance (Dahlander & Gann, 2010). When applying the Oslo Manual’s definition, innovation in the present study is measured by a composite index of different types of innovations or introductions of new or significantly improved products, operational processes, organisational or managerial processes as well as marketing methods. This construct is a measure of innovation breadth, being indicative of the number of areas in which SMEs apply innovations. In large firms Geroski et al. (1993) find that the marginal effects on corporate profitability continue to increase as the number of innovation objectives rises; indicating that higher innovation breadth benefit profitability. However, in SMEs resource restrictions may limit the development of a wide range of innovations. The establishment of network relations can provide an avenue to address this problem.

Networks have been identified as an important factor in numerous studies of the innovation process. Ahuja (2000) and Burt (2004) have each shown that both the number and structure of connections in collaboration networks can improve innovation outcomes. In trying to improve innovation outcomes, actively managing networks can directly lead to better results for firms (Kastelle & Steen, 2010). While the benefits of managing networks are widely acknowledged (see Malerba and Vonortas (2009) for an overview), there are again questions about how this knowledge applies in the case of SMEs.

Chesbrough (2006) has demonstrated the importance of networks in open innovation. Firms achieve and sustain open innovation by using a wide range of external actors and knowledge sources (Laursen & Salter, 2006; Lee et al., 2010; Lichtenthaler, 2009; Poot, Faems & Vanhaverbeke, 2009). Although SMEs contribute considerably to open innovation, they are affected by the open innovation process in a different way than large firms (Lichtenthaler, 2008). Findings suggest innovation in SMEs are becoming more open primarily due to the lack of resources in developing and commercializing new products on their own and as a result they are more inclined or forced to collaborate with other organisations (van de Vrande et al., 2009). This suggests that the direct effects of network connections may in fact differ in the case of SMEs.

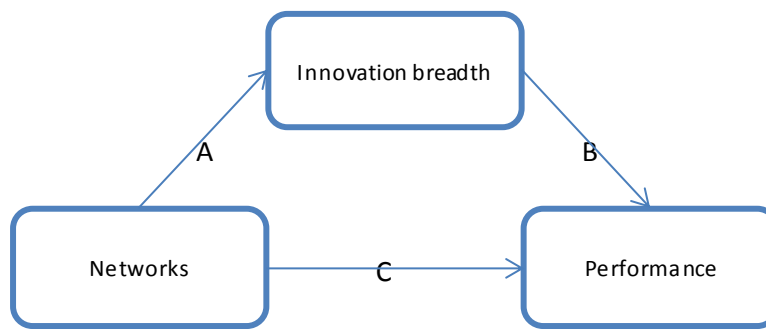
Networks provide access to social resources embedded therein that facilitates exploration and exploitation activities of SMEs (Florin, Lubatkin & Schulze, 2003; March, 1991). Social capital is therefore contingent on networks but not equivalent. This is in line with Lin's (2008) hypothesis that network features are exogenous to social capital, but contrary to the view of Cooke and Wills, (1999, p. 224) who state that "... social capital is the origin and expression of successful network interactions". We adopt Lin's interpretation that networks are exogenous to social capital here, leading us to use Nahapiet and Ghoshal's (1998, p. 243) definition of social capital as being the "... *sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit.*" Consequently, in this paper we aim to investigate how these broadly accepted results pertain to SME performance. This is important because SMEs account for the largest proportion of the world's enterprises, and make a substantial contribution to economic development and growth (OECD, 2009).

### **4.3 Conceptual Background and Research Hypotheses**

This section hypothesizes the relationships between networks, innovation and firm performance in SMEs. There are two views concerning the link between networks and firm performance. First, from a temporal or process perspective it is argued that the establishment of networks will lead to greater innovation breadth which will in turn translate to higher firm performance (van de Ven & Poole, 1989). Second, a number of perspectives, including social capital theory, support the existence of a direct relationship that is explained by social capital embedded in networks which translates to firm performance. In this case mediation by innovation is unnecessary.

We argue that resource restricted SMEs are unlikely to attain benefits from purposeless networking activities. Instead, networking should lead to productive activity, such as innovation, to impact on performance. Therefore, while somewhat phenomenon based, we identify and investigate four relationships as depicted in Figure 4.1 to test for mediation. These relationships are between networks and innovation breadth (Path A), innovation breadth and firm performance (Path B), networks and firm performance (Path C) and networks with firm performance as mediated by innovation breadth (Paths A and B). We further argue that this approach may be useful in explaining the conflicting results regarding the relationships between innovation, networks and SME performance. When these relationships are tested, we use longitudinal data in an attempt to better understand the temporal nature of these relationships, and overcome issues with cross-sectional approaches.

**Figure 4.1 Relational Mediation Model between Networks, Innovation and Firm Performance**



***Path A: Networks and Innovation Breadth***

The importance of networks and social capital to innovation in SMEs is well documented (Ahuja, 2000; Lee et al., 2010; Rogers, 2004; Zeng, Xie & Tam, 2010). The benefits of both intra-firm (Tsai & Goshal, 1998) and inter-firm networks (Molina-Morales & Martinez-Fernandez, 2010) are evident in that social network and associated social capital variables were found to contribute to both product and process innovation in SMEs. Indeed innovation occurs in social networks of actors across multiple contacts (Shane & Venkataraman, 2000; Burt, 1992). Authors such as Sullivan, and Marvel (2011), Thorgren, Wincent, and Örtqvist (2009), Schilling, and Phelps (2007) as well as Rothwell (1991) all support the notion that a wider range and number of network ties underpin innovation performance.

The establishment of networks holds several benefits for SMEs (Robinson, 1982). SMEs normally lack economies of scale in research, have less access to information, and other critical innovation resources (Mohannak, 2007). SMEs also tend to have insufficient capacity to individually manage the whole innovation process and are therefore encouraged to collaborate with other firms leading to potential pooling of resources and information (OECD, 2010b). Through establishing network relations, SMEs obtain advantages of large size without its associated disadvantages (Nooteboom, 1994; Rothwell & Dodgson, 1994). Therefore direct and indirect ties enhance a firm’s access to required inputs in the innovation process including skill accumulation through the combination of complementary skills and collective learning which occurs within networks (Pittaway et al., 2004).

Rosenbusch et al. (2011) challenge the assumption held by the network and social capital literatures highlighting the importance of inter-firm collaboration and networking in innovation for SMEs. They argue that internal innovation projects lead to greater firm performance than

innovation projects with external partners. In fact, they find that “the innovation projects that focus on external collaboration do not increase the performance of SMEs” (Rosenbusch et al., 2011, p. 13). They attribute this to the ‘liability of smallness’ and ‘liability of newness’ respectively referring to the dominance of bigger innovation partners and lack of experience (Edwards, Delbridge & Munday, 2005).

Granovetter’s (1973) investigation of the strengths of weak ties has opened a new line of enquiry into this relationship (Nahapiet & Ghoshal, 1998). March (1991) uses this logic to argue that strong ties promote exploitation or the use of knowledge whereas weak ties are important to new knowledge creation or exploration. Weak ties hamper complex information transfer and strong ties constrain information search in intra-organisational social networks. Network isomorphism thus decreases diversity in that excessive structural embeddedness, characterised by high degrees of trust and fine-grained tacit information transfer, which may insulate a firm from information that exists beyond its network (Uzzi, 1997).

Ahuja (2000) argues strong ties to enable trust (Coleman, 1988, 1990) but limit diversity of new ideas, whereas weak ties provide information benefits (Burt, 1992; Granovetter, 1973) but inhibits trust. He concludes that there is no simple, universal optimal network structure as it is contingent on the objectives of the network members. In addressing this issue, researchers employed a contingency or dynamic perspective to identify optimal network structures at various stages of the innovation process (Fukugawa, 2006; Kleinbaum & Tushman, 2007; Pirolo & Presutti, 2010). These results support the argument that weaker ties should be emphasised during the exploration or idea generation phase while strong ties engagement is most appropriate for innovation implementation or exploitation. Concluding from the theoretical arguments and empirical results, we argue that larger diversity of network ties permit SMEs to draw on additional external resources, allowing them to open up their innovation effort and to innovate across a broader range of activities. We further contend that our measurement of innovation, namely innovations already introduced by the firm, indicates that we are looking at exploitation which will benefit most from stronger ties (reflected in the interaction frequency encapsulated in the network measure). From the structural and relational dimensions of the social capital theory on networks we conclude that:

*Hypothesis 1: More heterogeneous and stronger network ties will be associated with greater subsequent innovation breadth in SMEs.*

### ***Path B: Innovation and Firm Performance***

To augment arguments underlying our model, we briefly review the relationship between innovation and firm performance here. This relationship has been well established in numerous studies over the past decades showing that innovation activities and output are important correlates or determinants of firm performance (Baldwin & Gellatly, 2003; Crepon, Duguet & Mairesse, 1998; Damanpour & Evan, 1984; Gopalakrishnan, 2000; Goudis et al., 2003; Hoffman et al., 1998; Kleinschmidt & Cooper, 1991; Klomp & van Leeuwen, 2001; Lööf & Heshmati, 2006; Mansury & Love, 2008; Prajogo, 2006; Roper et al., 2002; Wong et al., 2007). Some evidence about the causality of this relationship is also emerging, showing that innovators are persistently more profitable than non-innovators (Love et al., 2009). The notions of “breadth” and “depth” were introduced to respectively operationalise the variety of innovation objectives and information sourcing strategies as well as the intensity of these activities (Laursen & Salter, 2006; Leiponen & Helfat, 2010). We extend the concept to innovation output. Innovation breadth in the context of this study describes the heterogeneity in the categories of innovation. We therefore postulate that:

*Hypothesis 2: Innovation breadth is positively related to firm performance in SMEs.*

### ***Path C: Networks and Firm Performance link in SMEs***

The network perspective holds collective social capital at the firm level to enhance the likelihood of instrumental returns (Lin, 2008), increasing efficiency (Burt, 1992) and effectiveness (Gabbay & Leenders, 1999). The focal point here is on the benefits, returns and social rents of social capital not at the individual level (Granovetter, 1973, 1974, 1982) but rather at the institutional or firm level, assuming the member’s social capital to aggregate to the firm’s collective social capital (Nohria & Ghoshal, 1997). Networks spread risk, reduce innovation time and costs (Marinova & Phillimore, 2003) thus positively impacting on long-term firm performance and outweighing the immediate cooperation costs (DeBresson & Amesse, 1991; Zhou, Wu & Luo, 2007).

Besides network and social capital theories a number of other perspectives inform our theoretical understanding of the effect networks have on the firm performance of SMEs. The complex net of inter-organisational communication paths links the firm with its technological environment and marketplace (Rothwell & Zegveld, 1985), offering opportunities for and constraints on behaviour (Brass, Galaskiewicz, Greve & Tsai, 2004). Much emphasis has been placed on the role of networks with external firms to benefit resource poor SMEs, enabling them to survive competitive pressures from larger firms (Marinova & Phillimore, 2003). By implication, SMEs should pursue strategies focusing on the development of valuable networks with external resource holders in order to succeed (Lee et al., 2001). Such a view finds support in RBT (Penrose,

1959; Wernerfelt, 1984), which sees the creation and maintenance of networks as a mechanism in accessing scarce resources. Such scarce resources manifest as organisational capabilities or competencies leading to the creation of competitive advantages for SMEs. Networks not only provide access to external resources but also facilitate the creation and exploitation of social capital which in itself is regarded as a source of competitive advantage (Barney, 1991; Florin et al., 2003; Nahapiet & Ghoshal, 1998). Similarly, in recognising that a firm's resources may extend beyond the boundaries of the firm, the relational view regards inter-firm linkages as a source of “*relational rents*” and competitive advantage (Dyer & Sing, 1998, p. 661). Networks will therefore be directly and positively associated with firm performance, indicating that:

*Hypothesis 3: More heterogeneous and stronger network ties will be associated with subsequent improved firm performance in SMEs.*

### ***Paths A and B: Networks, Innovation and Firm Performance***

The mechanisms through which the performance benefits of networks translate into firm performance is not always self-evident from research results. While the relationship between networks and performance seems clear cut from the arguments above, Rodan (2010) has argued that innovativeness mediate the relationship between network density, knowledge heterogeneity and managerial performance. At the firm level, innovativeness have also been viewed as the mechanism that unlocks the performance benefits derived from social capital embedded in network structure and knowledge heterogeneity (Clifton, Keast, Pickernell & Senior, 2010).

The question is therefore; do benefits derived from networks directly translate to firm performance, or does the embedded social capital manifest itself through intermediate business processes like innovation? Seen from a temporal perspective (van de Ven & Poole, 1989), it can be argued that an indirect effect exists where networking underpin increases in innovation output (here operationalised as innovation breadth) and subsequent higher performance (Paths A and B in Figure 4.1). The positive relationship between networks and performance is therefore argued to be primarily the result of innovation output:

*Hypothesis 4: Innovation breadth mediates the relationship between networks and firm performance in SMEs.*



## **4.4 Research Method**

### **4.4.1 Sample**

The ABS's Business Longitudinal Data (BLD), released through a Confidentialised Unit Record File (CURF), comprises two independent samples (referred to as Panels) drawn from the Australian business population (ABS, 2011). The statistical analysis included in this article was done using Panel One due to the longer timeframe available at time of analysis as well as the relative stable macroeconomic market conditions prevalent during the period of analysis (2004-05, 2005-06 and, 2006-07). Economic stability would help ensure that exogenous extreme market fluctuations (e.g. the global financial crisis) do not impact or distort firm performance indicators. This panel contains responses from 2,732 firms, which was selected from a frame containing 1,563,857 Australian businesses as at June 2005 and was stratified by industry division and business size.

The BLD excludes firms classified as financial corporations, general government, not-for-profit institutions, and firms with income tax instalment payer role only, as well as non-employing businesses which report less than \$50,000 turnover. SMEs are classified as firms employing fewer than 200 employees. This classification is comparable to the majority of studies undertaken in the US and Europe, which ranges between 250 and 500 employees for small and medium enterprises (Verreynne, 2005). In addition, the BLD excludes firms from industries such as electricity, gas and water supply, finance and insurance, government, education, health and community services, libraries, museums as well as parks and gardens.

To ensure that the data were suitable for the study, the following restrictions were imposed. First, the non-employing firms were removed due to the overrepresentation of personal service providers and missing data on a number of variables for these firms. Second, firms without sales data recorded on Business Activity Statements (BAS) were removed. BAS are submitted by businesses to the Australian Tax Authority on a regular basis in respect of their General Sales Tax obligations. Third, firms that did not participate in the complete panel were also removed. The sample used in the analysis of this study from Panel One contained 1,435 subjects after these restrictions were imposed on the original 2,732 firms.

### **4.4.2 Measures**

Nine measures were created to test hypotheses: innovation breadth, firm performance (including efficiency and effectiveness), networks, age, size, market concentration and competition. Four of the measures were presented as categorical data in the dataset, and used as such in the regression analyses. These include age (number of years the business have been in operation regardless of

changes in ownership), size (number of employees), market share and number of competitors. The other five measures had to be calculated. Figure 4.2 provides an overview of the measurement operationalisation and includes descriptive and frequency statistics.

**Figure 4.2 Measurement Operationalisation, Descriptive and Frequency Statistics**

<b>Variables</b>	<b>Measurement Item/s (Marginal Percentages)</b>	<b>Values / Origin</b>
Size	Number of persons working for this business during last pay period ending in June (1 = 38.3%; 2 = 36.7%; 3 = 24.9%)	1 = 0 - 4 persons 2 = 5 - 19 persons 3 = 20 or more persons
Age	As at 30 June, how many years had this business been in operation regardless of changes in ownership (0 = 1.5%; 1 = 17.3%; 2 = 19%; 3 = 28.5%; 4 = 33.7%)	0 = Not applicable 1 = less than 5 years 2 = 5 to 10 years 3 = 10 to 20 years 4 = 20 years or more
Competitors	How many competitors did this business have during the year ended 30 June (1 = 15.4%; 2 = 14.1%; 3 = 68.4%; missing data = 1.8%)	1 = Captive market/no effective competition 2 = 1 or 2 competitors 3 = 3 or more
Market Share	Considering the market in which it operates, what share do you think this business had during the year ended 30 June (1 = 54.8%; 2 = 30.5%; 3 = 12.1%)	1 = Less than 10% 2 = 10% to less than 50% 3 = Greater than 50%
Industry: Primary (Baseline variable)	A = Agriculture, Forestry and Fishing B = Mining (26.2%)	Industry division (Source: ANZSIC Version 2006)
Industry: Manufacturing	C = Manufacturing E = Construction (21.7%)	Industry division (Source: ANZSIC Version 2006)
Industry: Logistics	F = Wholesale Trade I = Transport and Storage (16.3%)	Industry division (Source: ANZSIC Version 2006)
Industry: Retail	G = Retail Trade (13%)	Industry division (Source: ANZSIC Version 2006)
Industry: Services	H = Accommodation, Cafes and Restaurants J = Communication Services L = Property and Business Services P = Cultural and Recreational Services Q = Personal and Other Services (22.8%)	Industry division (Source: ANZSIC Version 2006)
Performance 2007 (Four Variables) (0.779) <sup>a</sup>	Compared to the previous year, did any of the following decrease, stay the same or increase: 1. Income from the sales of goods or services (0 = 4.9%; 1 = 29.2%; 2 = 21%; 3 = 44.9%) 2. Range of products or services offered (0 = 12%; 1 = 6.1%; 2 = 56.6%; 3 = 25.4%) 3. Profitability (0 = 6.1%; 1 = 32.1%; 2 = 28%; 3 = 33.9%) 4. Productivity (0 = 13%; 1 = 14.1%; 2 = 41.2%; 3 = 31.7%)	0 = Not applicable 1 = Decreased 2 = Stayed the same 3 = Increased
Effectiveness 2007 (Two Variables) (0.523) <sup>a</sup>	Compared to the previous year, did any of the following decrease, stay the same or increase: 1. Income from the sales of goods or services 2. Range of products or services offered	0 = Not applicable 1 = Decreased 2 = Stayed the same 3 = Increased

Efficiency 2007 (Two Variables) (0.717) <sup>a</sup>	Compared to the previous year, did any of the following decrease, stay the same or increase: 1. Profitability 2. Productivity	0 = Not applicable 1 = Decreased 2 = Stayed the same 3 = Increased
Innovation 2006 (12 Variables) (0.794) <sup>a</sup>	Did this business introduce any new or significantly improved: - Goods and Services 1. Goods (11.68%) <sup>b</sup> 2. Services (18.37%) <sup>b</sup> - Operational processes: 3. Methods of manufacturing or producing goods or services (9.56%) <sup>b</sup> 4. Supporting activities for business operations (12.98%) <sup>b</sup> 5. Other operational processes (9.36%) <sup>b</sup> - Organisational/managerial processes: 6. Knowledge management processes (13.08%) <sup>b</sup> 7. Major change to the organization of work (8.45%) <sup>b</sup> 8. Other organisational/managerial processes (4.87%) <sup>b</sup> - Marketing methods: 9. Changes to the design or packaging of a good or service (7.48%) <sup>b</sup> 10. Sales or distribution methods (8.49%) <sup>b</sup> 11. Other marketing methods (2.9%) <sup>b</sup> 12. Other marketing methods (derived) (15.01%) <sup>b</sup> Cumulative number of introductions made: (0 = 53.9%; 1 = 14.6%; 2 = 11.1%; 3 = 8.1%; 4 = 4.7%; 5 = 3.1%; 6 = 1.9%; 7 = 1.3%; 8 = 0.8%; 9 = 0.5%; 10 = 0%; 11 = 0.1%)	0 = No 1 = Yes
Networks 2005 (Nine Variables) (0.738) <sup>a</sup>	How frequently did this business seek information or advice from the sources below during the year ended 30 June: 1. External Accountants (0 = 20.95%; 1 = 41.01%; 2 = 38.05%) <sup>b</sup> 2. Financial advisors or banks (0 = 53.03%; 1 = 31.29%; 2 = 15.69%) <sup>b</sup> 3. Solicitors (0 = 59.3%; 1 = 28.1%; 2 = 12.59%) <sup>a</sup> 4. Business management consultants (0 = 85.95%; 1 = 9.15%; 2 = 4.9%) <sup>b</sup> 5. Others in same industry (0 = 53.78%; 1 = 27.44%; 2 = 18.78%) <sup>b</sup> 6. Industry Association/Chamber of commerce (0 = 77.64%; 1 = 14.41%; 2 = 7.95%) <sup>b</sup> 7. Australian Taxation Office (0 = 64.21%; 1 = 28.1%; 2 = 7.69%) <sup>b</sup> 8. Other government organisations (0 = 76.31%; 1 = 17.1%; 2 = 6.58%) <sup>b</sup> 9. Other (0 = 98.98%; 1 = 1.02%; 2 = 0%) <sup>b</sup> Cumulative count of number and frequency of network ties: (No network ties = 5.6%; 1 = 8.2%; 2 = 14.8%; 3 = 12.3%; 4 = 11.6%; 5 = 10.3%; 6 = 7.7%; 7 = 8.5%; 8 = 6.7%; 9 = 3.8%; 10 = 3.5%; 11 = 2%; 12 = 2%; 13 = 1.5%; 14 = 0.9%; 15 = 0.1%; 16 = 0.4%; 17 and 18 = 0%)	0 = Never 1 = 1-3 times 2 = More than 3 times

<sup>a</sup> Cronbach Alpha

<sup>b</sup> Frequencies derived from full panel frequencies,  $N = 2263$

*Networks* were measured by determining the number of network ties engaged in with different actors as well as the interaction frequency between the focal firm and these actors. The number of ties or network range (heterogeneity) is an indication of the structural dimension of social capital (Watson, 2007) whereas the interaction frequency or intensity represents the relational dimension (Hansen, 1999). Nine categories of external actor links were provided as options. The

network score is therefore an aggregate of both the range and intensity of the networks. The intensity score is one if the focal firm has interacted with the category of network actors between one and three times and the score is two if there were more than three interactions. Networks were recorded for the 2005 year of analysis, implying a one year lag on innovation (2006) and a two year lag on performance (2007) in this longitudinal study (Zeng et al., 2010). The Cronbach's Alpha for this measure was sufficient at 0.738 (Hair, Money, Samouel & Page, 2007).

**Innovation Breadth** was derived from the BLD measure of innovation that asks respondents if they have introduced any new or significantly improved goods and/or services, operational processes, organisational and/or managerial processes as well as marketing methods. Innovation breadth was therefore calculated by combining the different types of innovation into a single composite measure of innovation (Bhattacharya & Bloch, 2004; Laursen & Salter, 2006). The Cronbach's Alpha for this measure was 0.794 for 2006, indicating a high level of internal consistency. We placed innovation outside of performance as it is shown to be an important antecedent of firm performance although often described as "performance" in a number of studies (Chiang & Hung, 2010; Zeng et al., 2010).

**Firm Performance** is a multidimensional construct which used perceptual or self-reported measures of firm performance. Three performance measures were developed. An overall composite index of firm performance including all four variables was used to assist in accounting for most aspects of SME performance (Pangarkar, 2008; Wiklund & Shepherd, 2005). Two additional measures were created for supplementary analyses of our hypotheses to account for any potential differences between *effectiveness* (sales growth and range of product or service growth) and *efficiency* (profitability and productivity growth) as performance indicators (Caloghirou et al., 2004; Mansury & Love, 2008).

These measures were recorded for the 2006 and 2007 years of analysis. Satisfactory Cronbach's Alphas for the 2007 measures of overall firm performance and efficiency was obtained at 0.779 and 0.717 respectively. The Alpha for effectiveness was lower albeit still sufficient at 0.523. Although an alpha level of 0.70 or above is generally accepted, in research settings such as this it may still be regarded as sufficient at levels of 0.50 and above (Nunnally, 1967).

**Control variables** identified in similar studies as being endogenous and exogenous to the relationships investigated were introduced to account for their effect. The measurements employed in the controls which included age, size, number of competitors, market share and industry are summarized in Figure 4.2.

## **4.5 Analysis and Results**

### **4.5.1 Reliability and construct validity**

The measures employed in this study were tested for internal consistency reliability by applying the Cronbach's Alpha test (see Table 4.1). Validity, referring to accuracy in that a construct measures what it is supposed to measure (Hair et al., 2007), was tested by measuring correlations between similar constructs in the database. The correlations between the size measure employed and the derived size benchmark as well as between innovation breadth and expenditure for innovation capacity were positively correlated and statistically significant ( $p < 0.001$ ) at 0.63 and 0.406 respectively, confirming their validity. While the debate rages on about the significance of statistical significance (Chow, 1998; Johnson, 1999; Ziliak & McCloskey, 2008) the arbitrary baseline error level for this research is set at below a  $p$ -value of 0.001 for highly statistical significance and below 0.05 for marginal statistical significance, corresponding to the Two-Sigma Rule. No multicollinearity was detected that would violate assumptions for the general linear models tested, with Variance Inflation Factor (VIF) values ranging between 1.042 and 1.544 for all measures, not exceeding the acceptable threshold of 10 (Lomax, 1992).

### **4.5.2 Results**

Statistical analyses were performed using SPSS. Descriptive statistics and correlations, as shown in Table 4.1, were used to explore the data and to test two-way relationships between all of the variables included in the hypotheses. Because the majority of the variables were non-continuous, Spearman's rank correlation coefficient for rank data was employed (Saunders, Lewis & Thornhill, 2007).

**Table 4.1 Descriptive Statistics and Spearman's rho Correlation Coefficients**

Variables:	Alpha	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 Size		1.87	0.784	1										
2 Age		2.76	1.137	0.15***	1									
3 Competitors		2.58	0.743	0.14***	0.06*	1								
4 Market share		0.55	0.114	0.12***	0.04	-0.20***	1							
5 Firm Performance <sup>a</sup> 2006 Four Variables	0.776	2	0.735	0.23***	-0.04	0.06*	0.09***	1						
6 Firm Performance <sup>a</sup> 2007 Four Variables	0.779	1.96	0.734	0.24***	-0.05*	0.08**	0.10***	0.44***	1					
7 Effectiveness <sup>b</sup> 2006 Two Variables	0.551	2.04	0.779	0.22***	-0.06*	0.07**	0.09***	0.88***	0.41***	1				
8 Effectiveness <sup>b</sup> 2007 Two Variables	0.523	2.01	0.764	0.24***	-0.04	0.06*	0.09**	0.42***	0.89***	0.44***	1			
9 Efficiency <sup>c</sup> 2006 Two Variables	0.706	1.91	0.852	0.2***	-0.03	0.05	0.08**	0.91***	0.39***	0.61***	0.33***	1		
10 Efficiency <sup>c</sup> 2007 Two Variables	0.717	1.97	0.847	0.2***	-0.05	0.08**	0.09**	0.38***	0.92***	0.31***	0.63***	0.37***	1	
11 Innovation 2006 12 Variables	0.794	1.27	1.878	0.24***	-0.04	0.12***	0.06*	0.33***	0.25***	0.36***	0.27***	0.24***	0.18***	1
12 Networking 2005 Nine Variables	0.738	0.54	0.374	0.35***	0.03	0.12***	-0.01	0.18***	0.14***	0.15***	0.14***	0.16***	0.11***	0.26***

*N* = 1435. S.D., Standard Deviation; Alpha, Cronbach's Alpha.

<sup>a</sup> Firm Performance (Composite index of four variables: Profit, Productivity, Sales and Range of Product Growth).

<sup>b</sup> Effectiveness (Composite index of two variables: Sales and Range of Product Growth).

<sup>c</sup> Efficiency (Composite index of two variables: Profit and Productivity Growth).

\* *p* < .05; \*\* *p* < .01; \*\*\* *p* < .001, two-tailed.

As evident from Table 4.1, significant positive correlations were recorded between networking, innovation and all three measures of performance (for 2006 and 2007). The networking – innovation relationship was more pronounced than the networking – performance relationship, further supporting the relevance of investigating H4. Comparison of the correlations between networks and all three performance measures for 2006 with that of 2007 showed consistently stronger correlations with 2006 performance than 2007 performance revealing the potential existence of diminishing returns of networks over time. Firm size was significantly related to all variables confirming its important role in business processes. It is further evident that networked firms tended to be larger, and were exposed to higher levels of competition. Market share did not correlate with networking, implying that SMEs tend to network regardless of market share. As expected, the number of competitors was negatively correlated with market share.

Hypotheses were tested using hierarchical multiple regression analysis (Field, 2009), the results of which are reported in Table 4.2, and Table 4.3. Supplementary analyses on all hypotheses, containing performance as depended variable were undertaken to account for differences between efficiency and effectiveness measures as reflected in Table 4.4 and Table 4.5.

**Table 4.2 Regression Analysis: Impact of Networks 2005 on Innovation 2006 with Controls**

Independent Variables	Dependent Variable: Innovation 2006	
	Controls	Path A Networks
Firm Size	0.212***	0.152***
Firm Age	-0.052*	-0.048
Number of competitors	-0.017	0.012
Market Share	-0.048	-0.076*
Industry: Manufacturing	0.099**	0.105**
Industry: Logistics	0.089*	0.091**
Industry: Retail	0.013	0.022
Industry: Services	0.077*	0.08*
Networks 2005		0.159***
$R^2$	0.071	0.092
$R^2$ Adjusted	0.065	0.087
$F$ Statistics	13.54***	16.134***
$\Delta R^2$ Adjusted		0.022

Industry: Primary is the baseline industry variable.

$N = 1435$ . Standardized regression coefficients are reported.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ , two-tailed.

H1 was confirmed in the regression results, suggesting that networks matter to SME innovation (Table 4.2). Our analysis showed that network heterogeneity and tie strength in 2005 had a positive, significant relation to innovation breadth in 2006 ( $\beta = 0.159$ ,  $p < .001$ ). The model explained 8.7

per cent of the variance in innovation breadth, with a marginal contribution by networks of 2.2 per cent as evident from the adjusted  $R^2$ 's.

**Table 4.3 Hierarchical Regression Analysis: Effects of Networks and Innovation on SME Firm Performance<sup>a</sup>**

Independent Variables	Dependent Variable: Firm performance 2007			
	Controls	Path C Networks	Path B Innovation	Paths A and B Full Model
Firm Size	0.216***	0.193***	0.18***	0.168***
Firm Age	-0.068**	-0.066*	-0.059*	-0.059*
Number of competitors	-0.015	-0.015	-0.012	-0.012
Market Share	-0.096**	-0.094**	-0.088**	-0.087**
Industry: Manufacturing	0.113***	0.115***	0.096**	0.097**
Industry: Logistics	0.132***	0.133***	0.117***	0.118***
Industry: Retail	0.043	0.047	0.041	0.043
Industry: Services	0.122***	0.123***	0.109***	0.11***
Networks 2005		0.062*		0.036
Innovation Breadth 2006			0.17***	0.165***
$R^2$	0.095	0.099	0.122	0.123
$R^2$ Adjusted	0.09	0.093	0.117	0.117
$F$ Statistics	18.797***	17.351***	22.055***	20.041***
$\Delta R^2$ Adjusted		0.003 <sup>b</sup>	0.027 <sup>b</sup>	0.027 <sup>b</sup>

<sup>a</sup> Firm Performance (Composite index of four variables: Profit, Productivity, Sales and Range of Product Growth).

<sup>b</sup> Marginal change compared to control variables.

Industry: Primary is the baseline industry variable.

$N = 1435$ ; Standardized regression coefficients are reported.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ , two-tailed.



**Table 4.4 Hierarchical Regression Analysis: Effects of Networks and Innovation on SME Effectiveness<sup>a</sup>**

Independent Variables	Dependent Variable: Effectiveness 2007			
	Controls	Path C Networks	Path B Innovation	Paths A and B Full Model
Firm Size	0.2***	0.176***	0.159***	0.147***
Firm Age	-0.057*	-0.055*	-0.047	-0.046
Number of competitors	-0.04	-0.04	-0.036	-0.036
Market Share	-0.093**	-0.091**	-0.084**	-0.083**
Industry: Manufacturing	0.154***	0.156***	0.135***	0.136***
Industry: Logistics	0.185***	0.186***	0.168***	0.169***
Industry: Retail	0.086**	0.09**	0.084**	0.086**
Industry: Services	0.142***	0.143***	0.127***	0.128***
Networks 2005		0.063*		0.034
Innovation Breadth 2006			0.192***	0.187***
$R^2$	0.111	0.114	0.145	0.146
$R^2$ Adjusted	0.106	0.109	0.14	0.14
$F$ Statistics	22.229***	20.444***	26.888***	24.368***
$\Delta R^2$ Adjusted		0.003 <sup>b</sup>	0.034 <sup>b</sup>	0.034 <sup>b</sup>

<sup>a</sup> Effectiveness (Composite index of two variables: Sales and Range of Product Growth).

<sup>b</sup> Marginal change compared to control variables.

Industry: Primary is the baseline industry variable.

$N = 1435$ ; Standardized regression coefficients are reported.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ , two-tailed.

**Table 4.5 Hierarchical Regression Analysis: Effects of Networks and Innovation on SME Efficiency<sup>a</sup>**

Independent Variables	Dependent Variable: Efficiency 2007			
	Controls	Path C Networks	Path B Innovation	Paths A and B Full Model
Firm Size	0.193***	0.174***	0.168***	0.157***
Firm Age	-0.066*	-0.065*	-0.06*	-0.059*
Number of competitors	0.01	0.01	0.012	0.012
Market Share	-0.082**	-0.08**	-0.076*	-0.075*
Industry: Manufacturing	0.056	0.058	0.044	0.046
Industry: Logistics	0.061*	0.062*	0.05	0.051
Industry: Retail	-0.004	-0.001	-0.005	-0.003
Industry: Services	0.083**	0.083**	0.073*	0.074*
Networks 2005		0.051		0.032
Innovation Breadth 2006			0.121***	0.116***
$R^2$	0.059	0.061	0.073	0.074
$R^2$ Adjusted	0.054	0.056	0.067	0.067
$F$ Statistics	11.225***	10.371***	12.436***	11.331***
$\Delta R^2$ Adjusted		0.002 <sup>b</sup>	0.013 <sup>b</sup>	0.013 <sup>b</sup>

<sup>a</sup> Efficiency (Composite index of two variables: Profit and Productivity Growth).

<sup>b</sup> Marginal change compared to control variables.

Industry: Primary is the baseline industry variable.

$N = 1435$ ; Standardized regression coefficients are reported.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ , two-tailed.

The relationship between innovation breadth and all measures of performance was significant with the highest marginal effect recorded for SME effectiveness ( $\Delta R^2$  Adjusted = 0.034). This confirmed H2, namely that innovation breadth relates to SME performance during the year after its introduction. H3 was confirmed for the overall performance measure and for effectiveness but not for efficiency. Network heterogeneity and tie strength in 2005 had small positive, marginally significant relationships with SME performance ( $\beta = 0.062$ ,  $p. < .05$ ;  $\Delta R^2$  Adjusted = 0.003) and effectiveness ( $\beta = 0.063$ ,  $p. < .05$ ;  $\Delta R^2$  Adjusted = 0.003) in 2007. Networks did not explain any of the variance in efficiency of SMEs.

Baron and Kenny's (1986) approach to test for mediation was used to investigate H4 (see Figure 4.1). The variables used covered three time periods, namely 2005 (networks), 2006 (innovation breadth) and 2007 (firm performance). We also tested variables in other time period combinations to ensure that we had the optimal solution to our model. Therefore, in addition to H1 and H2 which tested Path A and Path B, we had to control for innovation breadth in the model testing the relationship between networks and performance (Baron & Kenny, 1986). In this full model (see Table 4.3 and Table 4.4), the relationships between networks and SME performance as well as effectiveness became non-significant; indicating complete mediation and confirming H4. The absence of a relationship between networks and efficiency imply that no mediatory effect with innovation is possible in this relationship (Table 4.5).

The addition of controls to the models had one notable effect, namely that the relative contribution of size to innovation breadth decreased with the introduction of networks in the model as evident from the standardized regression coefficients of size ( $\beta = 0.212$  decreased to  $\beta = 0.152$ ; both at  $p. < .001$ , in Table 4.2). It may also account for the small increase in effect size ( $\Delta R^2$  Adjusted = 0.022) indicating that the variance of networks may have been accounted for by the size variable in the controls regression. The industry variables also contributed variously to explained variance in the performance measures. These results are discussed next.

#### **4.6 Discussion**

The purpose of this study was to investigate the contribution of networks to innovation and firm performance in SMEs. The positive impact of networks on both innovation and performance is well established in theory and research reviewed in this article. The mechanisms, by which social capital embedded in networks is reflected in SME performance, are still not clear and somewhat controversial (Clifton et al., 2010; Maurer et al., 2011). The present study contributes by proposing

that innovation mediates the relationship between networks and firm performance. In this view, innovation is the mechanism through which firms are able to unlock the benefits of social capital. In fact, it might be the case that innovation is simply one of several such mechanisms. This would explain the relatively small effect size measured, and it also suggests a potentially important line of further research.

Our findings support Nooteboom's (1994) conjecture that by establishing networks SMEs obtain advantages of larger size. Networks provide SMEs with more access to resources, complementary skills, capabilities and knowledge that are not internally available (Døving & Gooderham, 2008; Pittaway et al., 2004). Such resources are essential to innovation implementation, further confirming structurally embedded (heterogeneous ties) as well as relationally embedded (strong ties) social capital to enhance broad range implementation of innovation or exploitation (Hansen, 1999; Kleinbaum & Tushman, 2007; March, 1991; Pirolo & Presutti, 2010).

Innovation breadth was also found to support SME performance. This supports other empirical studies which show that innovation output enhances firm performance because of among others, increased competitiveness, but that the innovation process also transforms the firm's internal capabilities, making it more adaptive to change (Love et al., 2009; Mohannak, 2007). This view is compatible with the dynamic capabilities perspective (Teece et al., 1997) in that "... the process of innovation ... transform firms in some way that give rise to what look like generic differences between innovators and non-innovators ..." (Geroski & Machin, 1993, p. 35).

The relationship between networks and performance is much less pronounced than the relationship between networks and innovation. Networks have a small positive relationship with sales growth and range of product or service growth but no relationship was evident with profitability and productivity growth. This finding contributes a more detailed explanation of the mechanisms through which performance benefits are derived from network establishment by arguing that innovation output should be regarded as an intermediate outcome linking networks as an element of the process of innovation with firm performance.

#### **4.7 Conclusion**

Some limitations must be noted. First, the measures used in this study were captured in the BLD as primarily categorical or binary data, and therefore do not fully reflect the depth of the phenomena investigated. Instead it represents a count of their presence. However, there is a wealth of information captured in the BLD and other similar CIS in other countries. These databases contain

longitudinal data which is complicated and expensive to obtain otherwise, and can be valuable to inform debate on innovation, networking and the factors that facilitate or hamper these activities. Further mining of these databases would be useful to investigate whether additional intermediate outcomes mediate the network – performance relationship. It may also be prudent to test if similar results are evident in large firms to determine if networks differentiate SMEs in terms of the mechanisms through which they unlock performance benefits.

Second, the effect sizes obtained in the regressions were low, but must be interpreted against the data that were selected for analysis. Where other research that report on similar datasets focus on innovating firms or one industry segment only, or alternatively use the upper and lower performance level quartiles of the sample for analysis, we analysed all the data in all industries that met our parameters (e.g. Love et al., 2009; Watson, 2007). This decision was purposeful to ensure that a more accurate picture of innovation and networking in our sample was portrayed. Future research applying similar approaches may assist in comparative analysis of effect sizes obtained in this study. Last, there were several benefits, as noted before, in using the BLD in this article. Nevertheless, additional empirical investigation that more specifically measures the constructs that may explain these relationships, such as cognitive social capital and dynamic capabilities would provide additional valuable insights. Although our network measure captures elements of both breadth and depth, due to limitations in our database, the innovation measure applied only capture the breadth dimension. Future research may address this issue in their research design.

Based on the theoretical model that we presented, and the empirical confirmation from the BLD, three major implications stem from this article. First, we use measurements taken at three different points in time from firms in a large dataset to show that networks relate to innovation, which in turn relates to economic performance. Analysis of these relationships using longitudinal data overcomes the limitations of the plethora of cross-sectional studies (e.g. Bowen et al., 2010; Lööf & Heshmati, 2006) and enables us to understand the fine grained details of the relationship in capturing the “intertemporal” behaviour of firm performance (Roberts, 1999, p. 657). As such, we are able to see that networks have diminishing returns over time, and that mediation by innovation may best explain the relationship.

Therefore, second, while all these phenomena were correlated, regression analyses indicate that networks do not have a relationship with performance when controlled for innovation. Instead, this relationship is mediated by innovation breadth. We maintain that cultivating networks is important to performance, but unlike most previous studies, we show that networks first support intermediate outcomes, in this case innovation, which in turn underpin performance. This does not mean that innovation is the only organisational outcome that will mediate this relationship.

Innovation may also act as mediator in other relationships where performance is the dependent variable, such as marketing and learning orientations (Mavondo, Chimhanzi & Stewart, 2005). This could be the subject of future research.

On a practical level, the importance of this finding is seen in the diminishing relationship between networks and performance shown in the correlation table. Unless networks are used for productive means, efforts to cultivate and maintain them may be wasteful. SME owners and managers should therefore utilize their limited resources in establishing diverse and strong network links in adopting an open innovation orientation. Such network links should be primarily directed at increasing innovation breadth; a mechanism that unlocks the performance value of networks.

## **5. STUDY FOUR: BUSINESS MODEL DESIGN AND INNOVATION: UNLOCKING THE PERFORMANCE BENEFITS OF INNOVATION**

This chapter presents a study that was submitted for publication, accepted and awaiting publication at date of submission of this thesis for examination. The version of the study presented in this chapter contains revisions made following comments from the editors and reviewers and is still under review at the date of submission of this thesis:

Gronum, S., Steen, J. T., & Verreyne, M. (In press). Business model design and innovation: unlocking the performance benefits of innovation. *Australian Journal of Management*. The consent of both co-authors was obtained for inclusion of this publication in the thesis. Full acknowledgement of their contributions are provided in the statement of contributions (see page iv). The original accepted article was edited for inclusion in this thesis only to the extent that consistency with the style adopted in this thesis is reflected.

### **ABSTRACT**

We investigate the relationships between innovation in the business model, business model design themes, and firm performance. The ‘business model view’ and the related ‘business model innovation’ as emerging strategy, and innovation research domains remain both ill-defined and marred by vague construct boundaries and limited empirical support. We build on existing theory to test our research model in a sample of 331 Australian firms. We find that business model design themes, which we argue are mechanisms for appropriating value from the firm’s business model, to mediate the relationship between innovation and firm performance. Innovation without clarity in the business model leads to modest or negligible performance outcomes. We advocate novelty-centred design themes because they unlock and translate the value from innovation to firm performance to a greater extent than transaction efficiency and user simplicity. We contend that broad innovation within the business model matters to performance but only if firms focus their business model design efforts more narrowly on coherently entrenching novelty and efficiency within their activity and transaction architecture.

### **5.1 Introduction**

In the popular literature, the business model concept has gone from an idea (Zott et al., 2011) and a theoretical concept to being a research agenda (Aspara et al., 2010; Lambert & Davidson, 2013)

within a very short time. Notwithstanding its increased adoption in the strategy literature, the concept remains poorly defined and misunderstood (Teece, 2010). Empirical analyses are limited in the absence of “frameworks for normative or predictive findings” (George & Bock, 2011, p. 85).

While different dimensions of the business model concept are apparent, there is some convergence of two central components. A business model describes how an organisation creates value for its customers and how it shares in that value (Teece, 2010). While this is an internal view of organisations, similar to the resource-based view (Demil & Lecocq, 2010), the advantage of the business model view is that the value of a product or service is defined by the customer and different customer groups who have varying perceptions of value (Priem, 2007). Unlike the position of the resource-based view, a firm’s resources are not intrinsically valuable (Priem & Butler, 2001), but only become valuable when they are organised to create value for the customer.

Emanating from the ‘business model view’ is the construct of business model innovation. While it is almost implicit that this involves reorganising a business to create different forms of value for existing or new customers, how the construct should be operationalised lacks clarity. Further, although Xerox photocopiers, Apple iPods, and Spotify internet music are intuitive examples of business model innovation, they are also examples of what we would recognise as conventional product and service innovations. The strategy and innovation literature is ambiguous as to where business model innovation fits within existing paradigms. What actually constitutes business model innovation, as opposed to conventional innovation (product, process or service), is unclear. The current status of business model innovation in the literature is immature to the point of being ‘we know it when we see it’.

In this paper, we respond to calls for more research on the “mechanics and processes of business model innovation” (George & Bock, 2011, p. 88; Johnson et al., 2008), as well as the complex two-way relationship between innovation and business model choice (Baden-Fuller & Haefliger, 2013). We do this by providing empirical evidence for a relationship between innovation within business models, business model design, and firm performance. We argue that the relationship between innovation and performance is mediated by the presence of a coherent business model design theme. For this purpose, we introduce three business model designs, namely novelty, transaction efficiency, and user simplicity, thereby extending the approach of Zott and Amit (2007).

To achieve our aim of examining these relationships, our paper is organised as follows. First, we define the business model construct and provide an integrated framework depicting the interdependencies between business model elements, business model design themes, and business model innovation. We then proceed to develop hypotheses to test the relationships between these

constructs and firm performance. Next we describe our research design and data, which is based on a survey of 331 Australian firms, and then describe the findings of our multivariate analyses. We conclude by showing that, while novelty and transaction efficiency business models are important to ensure that firms benefit from innovations to business model elements, user simplicity may not provide similar benefits.

## **5.2 Background**

A sound business model is the key to business viability (Magretta, 2002) to the extent that every firm models their business to explain how it creates value (Chesbrough, 2007). While business models are as old as value creation itself, the term has only recently been academically researched broadly. In the contemporary literature, business modelling can be traced back to the “emerging knowledge economy” and growth in e-commerce (Teece, 2010, p. 174). Driven by the advent of the internet, the new knowledge economy created the need to distinguish digital business from traditional bricks-and-mortar approaches. Business models became a buzzword, widely used and adopted in practice during the early 1990s, as reflected in popular business articles, company reports, and online blogs. At the same time, internet-based business models became prominent as a vehicle for small firms to successfully compete on a global scale with traditional firms.

These trends led academic research to adopt the concept after 1996 when business models appeared widely in the literature for the first time (Lambert & Davidson, 2013). The business model construct was therefore adopted from and firmly grounded in business practice (Teece, 2010). Academic recognition was, however, not universal as is clearly argued by Porter (2001, p. 73) that business models inspire “The Internet's Destructive Lexicon [and motivate] an invitation for faulty thinking and self-delusion”. Adoption of the business model ‘view’ in academic research is further hampered because it is ill-defined and has no discernible paradigmatic home, leading to researchers adopting diverse paradigms in conceptualising business models (Amit & Zott, 2001; Morris et al., 2005). The increasing popularity of the business model concept as “complex systems or configurations” of “tightly reinforcing” organisational elements may also stem from its potential to create a vocabulary for theory development in linking organisational development and performance (Siggelkow, 2002, p. 125) as a central theme in strategy literature. Such vocabulary development is dependent on construct definition, which is discussed next.



### 5.3 Business Model Definition

The business model as a rapidly developing topic of inquiry in strategy, innovation and entrepreneurship literature is marred by inconsistent conceptualisations and ambiguous construct boundaries (George & Bock, 2011). In their literature review of business models, Zott et al. (2011, p. 1020) conclude that, since 1996, business models have been a new, distinct unit of analysis that emphasises “a system-level, holistic approach to examining how firms do business’ by creating and capturing value. Business model conceptualisations centre on the activities of a firm as well as its partners, suppliers and customers. These models involve therefore complex sets of evolving interdependent activities or “routines that are discovered, adjusted, and fine-tuned by ‘doing’” (Winter & Szulanski, 2001, p. 731).

Using the extant literature, we define a business model in this study as:

*an abstraction of strategy (Seddon, Lewis, Freeman & Shanks, 2004); of ‘how a firm does business’, capturing the heuristic logic (Chesbrough & Rosenbloom, 2002) of how a firm creates, delivers and captures value through its activity (Zott & Amit, 2010), and transaction system architectures (Nystrom & Starbuck, 1984), in concert with its boundary-spanning relationship network (Teece, 2010; Zott & Amit, 2010).*

We distinguish business models and strategy next.

### 5.4 Business Models and Strategy

The distinction between business models and strategy is often blurred and sometimes indistinguishable. This is to be expected, considering that strategy is richly theoretical, and as discussed above, business models originated from practice outside any theoretical paradigm (George & Block, 2011). Notwithstanding its practice genesis, the business model concept has found a home in entrepreneurship and strategy literature. Business model conceptualisations are characterised by using various business strategy elements; “value chain”, “value systems”, “strategic positioning”, “resource based theory”, and “strategic network theory” (Morris et al., 2005, p. 728). The conceptualisation of the relationship between strategy and business models varies significantly within the scholarly discourse (Seddon et al., 2004). Although these authors note that some researchers do not distinguish the concepts, others see them as overlapping to varying degrees, while others see the one as encapsulating the other.

Yet empirical papers on this topic seem to adopt the stance that business models are not the same as strategy. A business model makes explicit the strategic choices of the firm, representing abstractions of implemented or realised strategy (Casadesus-Masanell & Ricart, 2010; Seddon et al.,

2004). Morris et al. (2005) see business models as a tool for creating sustainable competitive advantage in a defined market. Similarly Chesbrough and Rosenbloom (2002) see the functions of business models to include specifying the firm's market and competitive position as well as formulating the competitive strategy for sustained competitive advantage.

Seen against this background, it is very difficult to distinguish between strategy and business models. Magretta (2002) disagrees that business models incorporate competition as a critical dimension of performance. Strategy traditionally focuses on how firms use their resources to compete in the market (Chandler, 1962), whereas business models focus on the activity system for value creation as an abstraction of the business' strategy (Seddon et al., 2004). This accords with George and Block's (2011, p. 102) view that "business models are opportunity-centric, while strategy is competitor or environment centric". They contend that the business model is the "nonreflexive", static, "configurational enactment" of entrepreneurial opportunity whereas strategy is dynamic in optimising the configurational effectiveness, changing the configuration or underlying opportunity and seeking new opportunities (George & Block, 2011, p. 102). "Strategy analysis is thus an essential step in designing a competitively sustainable business model" (Teece, 2010, p. 180). We therefore contend that although highly interrelated, business models and strategy are not the same in that the business model is a static abstraction of the firm's strategy (Seddon et al., 2004).

Other than the above debate, another important research agenda emerges that requires scholarly attention: to decipher the complex links between organisational innovation, business model choice, and firm performance (Baden-Fuller & Haefliger, 2013; George & Block, 2011). To direct this research, we present a conceptual framework next, which is then tested empirically to extend the multitude of case studies on this topic (Lambert & Davidson, 2013).

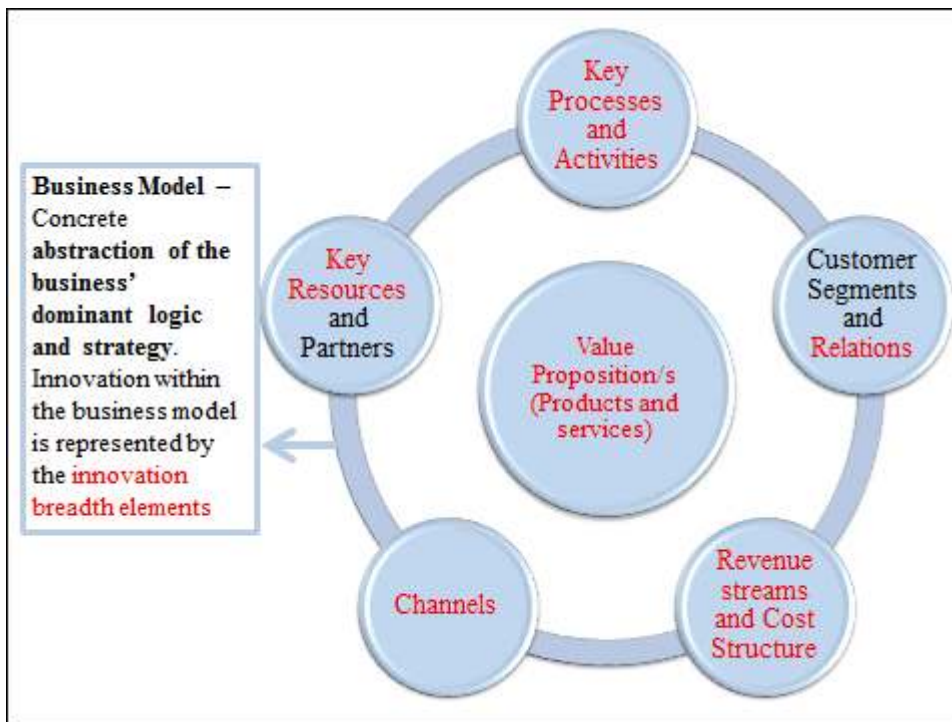
## **5.5 An Integrated Theoretical Framework: Innovation Within the Business Model and its Design Themes**

### **5.5.1 Business model elements**

The practical appeal of the business model concept lies in its ability to present, clarify and simplify the essential elements of how the business creates and captures value (Neubauer, 2011). Many different conceptualisations of these elements are provided in literature (Chesbrough & Rosenbloom, 2002; Doganova & Eyquem-Renault, 2009; Johnson et al., 2008). Figure 5.1 represents the business model elements adopted from Osterwalder and Pigneur (2010), which fit our

business model definition (Osterwalder, 2004). Spencer (2013, p. 18) adopts a similar model and refers to it as the “foundational level business model” in that while it represents the basic processes and activities to create and deliver value, it is insufficient to ensure competitive advantage. Although most of the business model elements are observed at the organisational level of analysis, some also transcend the traditional boundaries of the firm in that these elements include various network partners along the value chain and within the immediate competitive and industry environments.

**Figure 5.1 Business Model Elements**



We argue that this static abstraction of the business' dominant logic, often used as a point of departure for management experimentation with alternative strategies, is also a recipe for managers to innovate by modifying or completely redesigning their businesses' architecture to make it “fit for the future” (Baden-Fuller & Morgan, 2010; Zott & Amit, 2010, p. 216). Firms can therefore innovate in the elements of their business models to create unique and more efficient business models for increased competitiveness as discussed in the next section.

This approach to defining a business model is very similar to what we term ‘innovation breadth’ in Sub-section 5.7.2. To illustrate, the variables used to operationalise this construct are highlighted in red in Figure 5.1. It includes the introduction of new technology as product and service innovations (associated with the value proposition) as well as a diverse set of processes

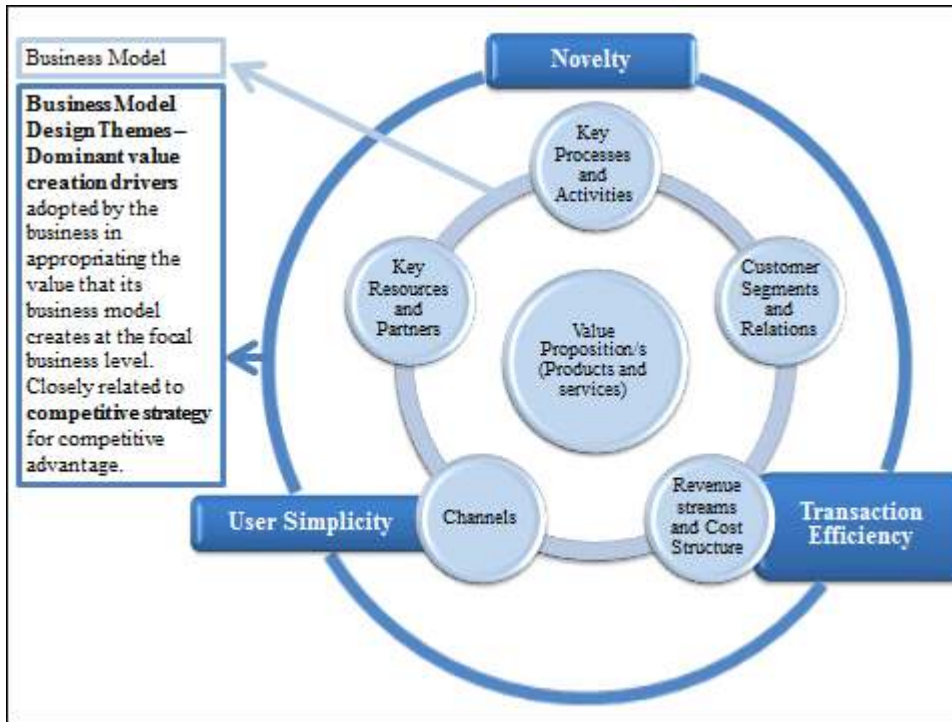
related to innovations in other elements of the business model. Innovation breadth therefore relates to seven of Osterwalder and Pigneur's (2010) nine business model building blocks, namely, customer relations, channels (communication, distribution and sales), revenue streams, value propositions, key resources, key activities, and cost structure. Customer segments and key partnerships are the only elements excluded from the scope of our innovation breadth measure. Innovation breadth therefore indicates innovation within the business model, albeit not a proxy for business model innovation. It neither tests for the novel reconfiguration of the business model dimensions of "resource structure, transactive structure and value structure" (George & Bock, 2011, p. 99) nor the activity system's content, structure, and governance (Zott & Amit, 2010, p. 222).

### **5.5.2 Business model design themes**

While business models are "representations of the firm's business" (Bock, Opsahl, George, & Gann, 2012, p. 290), or a static representation of how the "pieces of a business fit together" (Magretta, 2002, p. 91), business model designs enact new strategy to create differential advantage and/or exploit opportunity within the competitive and industry environments.

Zott and Amit (2010, p. 222) develop "an activity system design framework" that sheds light on the connection between business model elements, business model design, and strategy. The firm can enhance its value creation of, and captured value from, the business model by adopting one or more of the following dominant "value creation drivers" or "design themes": "novelty, Lock-In, Complementarities or Efficiency" (Amit & Zott, 2001; Zott & Amit, 2010, p. 222). These design themes are not mutually exclusive. They "describe the holistic gestalt of a firm's business model" (Zott & Amit, 2008, p. 4). They are also close to the realm of strategy as they emphasise value capture at the firm level (Chesbrough & Rosenbloom, 2002). Firm performance is thus seen as a function of the fit between business model design themes and strategy (Zott & Amit, 2008). Firms do not compete on specific aspects of their business models such in products alone; competition rather takes place between business models in the market. This is in line with what Spencer (2013) refers to as a "differentiated business model", where competitive advantage is included, "providing value that customers perceive as novel, or better, or cheaper" than competitive offerings (p. 5). In this paper, we adopt and build on the operationalisation of business model design themes proposed by Zott and Amit (2007; Amit & Zott, 2012). Figure 5.2 displays how the business model design themes relate to the elements of the business model.

**Figure 5.2 Business Model Design Themes**



Our purpose is to test how these business model design themes relate to innovation within the business model and performance, as discussed next.

### **5.6 Research Model: Innovation Breadth, Business Model Design, and Performance**

Although innovation encompasses invention, it is only when an invention or creative idea is institutionalised, implemented or commercially exploited that it becomes innovative (van de Ven, 1986). In its broadest sense, innovation therefore implies value-added novelty. Overwhelmingly, research empirically shows a positive link between innovation (including innovation breadth) and different measures of firm performance (Baldwin & Gellatly, 2003; Gronum et al., 2012; Hoffman et al., 1998; Klomp & van Leeuwen, 2001; Love et al., 2011; Mansury & Love, 2008; Prajogo, 2006; Roper et al., 2002). Innovation breadth, as a proxy for innovation within the business model elements (as discussed in Sub-sections 5.5.1 and 5.7.2), is therefore also expected to positively relate to firm performance. We therefore hypothesise that:

*Hypothesis 1: Innovation breadth is positively related to firm performance.*

McGrath (2010) argues that the business model perspective provides the opportunity for strategy researchers to move beyond a fixation on resource endowment to focus rather on how these resources are used to move dynamically from one temporary competitive advantage to the next.

Practitioners clearly believe that the business model matters to firm performance and survival as it relates to exploiting opportunities (George & Bock, 2011). Notwithstanding the practitioner sentiments, adopting Zott and Amit's (2007) model clearly shows that firm performance results from specific business model characteristics. The "design themes that orchestrate and connect the elements of the business model" (Zott & Amit, 2007, p. 183) represent powerful tools for creating competitive advantage (Johnson et al., 2008; Teece, 2010) and indeed have the potential to disrupt the traditional logic of its market (Sabatier, Mangematin & Rousselle, 2010). Hence, it acts as a force for creative destruction (Schumpeter, 1950) in generating entrepreneurial rent (Schumpeter, 1934). Using Zott and Amit (2007), we argue that, although the three types of business model designs will vary in how strongly they relate to performance, all three are nevertheless important to performance:

*Hypothesis 2: Business model design themes (directed at creating and capturing value through novelty (H2a), transaction efficiency (H2b) and user simplicity (H2c) are positively associated with firm performance.*

As argued above, the complex "paths to monetization": linking innovation, the business model, and business performance remain controversial (Baden-Fuller & Haefliger, 2013, p. 422). We therefore ask: does the dominant business model design change in the wake of innovation or do changes in dominant business model design initiate innovation? We respond by suggesting that a business model plays two roles in innovation: it is an essential ingredient for successful innovation, but also a source of innovation (Teece, 2010). First, unlocking the value from new technological innovations may require the development of new business models to "translate the technical success into commercial success" (Johnson et al., 2008; Teece, 2010, p. 184). This does not imply that introducing all new innovations would require business model innovation because new product or process innovations may be successfully applied to existing business models. However, when a firm introduces diverse innovations across a broad spectrum of business activities and processes (i.e., innovation breadth), the firm will more likely succeed in introducing these innovations. Seen from this perspective, innovation breadth is closely related to new or changed business model design. In effect, this relationship may determine business model structure (George & Bock, 2011). We therefore hypothesise that:

*Hypothesis 3: Innovation breadth is positively associated with the novelty (H3a), transaction efficiency (H3b) and user simplicity (H3c) business model design theme.*

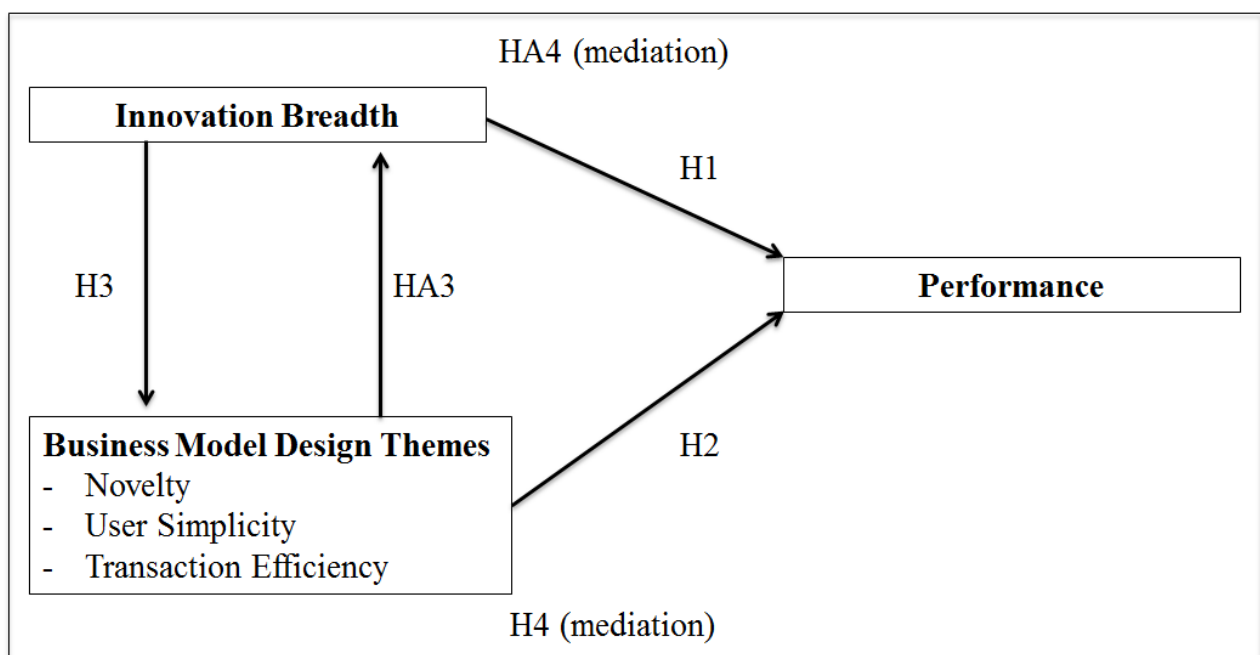
The choice of business model ensures that value from innovations are captured and monetised within the competitive landscape by affording the business a competitive advantage (Baden-Fuller & Haefliger, 2013; Teece, 2010). The business model design themes (as operationalised in this

paper) of novelty, transaction efficiency, and user simplicity indicate the value creation drivers that the business adopts “to appropriate the value that its business model creates” (Zott & Amit, 2007, p. 183). From there, we extend the above line of reasoning by building on Zott and Amit’s (2007, p. 194) “theory of business model design that explains how value is created at the business model level of analysis and how value is captured at the focal firm level of analysis”. We argue that the value derived from innovation breadth, as a proxy for innovation within the business model, would be captured by the dominant business model design themes, hence:

*Hypothesis 4: The positive association between innovation breadth (innovations within the business model) and perceived firm performance is mediated by the novelty (H4a), transaction efficiency (H4b) and user simplicity (H4c) business model design themes.*

These hypotheses are summarised in Figure 5.3.

**Figure 5.3 Research Model**



## 5.7 Research Design

### 5.7.1 Sample and data

We tested our hypotheses using a sample of 331 firms from a major urban region in Australia. We focused on firms in internationally tradable industries such as manufacturing, construction, information media, and professional services to avoid firms that were not in highly competitive

markets. A statistically random stratified sample within these industries was drawn to ensure representativeness across these industries, firm sizes and ages. A total of 785 firms were contacted by phone in June 2013. Of these firms, 208 were not contactable and 246 firms declined to participate. Our response rate was therefore just more than 61 per cent.

To ensure reliability and validity, we took five steps. First, we used CATI assisted phone surveys by a third party provider to overcome the typical low participation rates in mail surveys in Australia. This led to a greater number of completed surveys thus reducing statistical bias owing to missing data. Second, our response rate and stratified sampling strategy gave us confidence that response bias was not a major issue. Because we were in the field for fewer than two weeks, we could not use wave analysis to test for response bias (Armstrong & Overton, 1977)

Third, in designing a questionnaire to address each of the variables in our research model, we used past studies to derive survey items, as described in the next section. Fourth, we used a panel of public sector economic policy and industry experts to review the draft questionnaire. This process allowed minor changes to existing items to improve its consistent interpretation by respondents and ensure face validity. It also identified redundancy in the business model items, after which we removed some questions as explained next. Last, and also in the next section, we conducted both exploratory and confirmatory factor analysis of our scales to ensure reliability.

### 5.7.2 Variables

*Perceived firm performance* was measured using the approach developed by Covin and Slevin (1989) and Gupta and Govindarajan (1984) and used widely in studies that include large numbers of small firms (Brockman et al., 2012; Li et al., 2013; Verreyne et al., in press). We adapted this scale to be representative of a broader measurement approach (e.g. Kaplan & Norton, 1996), to include measures of customer satisfaction, market share, growth and profit. This approach asks respondents to rate the importance to the firm of, and their associated satisfaction with, 11 financial measures on a five-point Likert scale. The satisfaction scores are then multiplied by the importance scores and aggregated to compute a weighted average performance index for each firm. The higher the aggregate score on this index, the better the perceived level of firm performance. The reliability of the resulting scale was calculated using the Cronbach Alpha statistic ( $\alpha=.815$ ).

*Innovation breadth*: The Oslo Manual's guidelines in standardising innovation measurement, used in large-scale innovation surveys among OECD countries (OECD, 2011), were adopted in this paper. Innovation breadth refers to implementing different types of innovation across a range of eight business model elements, namely, products, services, production, product process, service process and managerial, marketing or human resources processes (see Figure 1) (Geroski et al.,



1993; Grönum et al., 2012). It does not measure innovation depth, intensity or frequency of the specific types of innovation. Firms were also asked to indicate if their innovations were new to the firm or new to the industry on each of these innovation types, resulting in our innovation breadth variable ranging from eight to 16. The innovation types were not mutually exclusive, as firms could have developed more than one type of innovation. The reliability of the resulting scale was calculated using the Cronbach Alpha statistic ( $\alpha=.747$ ).

*Business model design themes* were measured using Zott and Amit's (2007) scale, originally developed with 26 items to operationalise two types of business model design themes, namely, design efficiency and design novelty. The survey targeted large firms, often comprising several business units or serving diverse markets. Our panel of experts found a high level of repetition in nine of the items, thus making them less relevant to the large number of small firms that were also targeted by our survey. Considering the high number of items representing each construct, we deleted these from our scale. Items were rated on a five-point Likert-type scale, anchored with strongly disagree and strongly agree. We used Kaiser's (1974) and Cattell's (1966) rules to determine the optimum number of factors based on exploratory factor analysis. We used principal axis factoring to extract factors, and applied a promax rotation to allow for correlations between the factors. As suggested by Hair, Black, Babin, Anderson and Tatham (2010), correlations above 0.3 were considered to be strong. The final factor pattern showed a simple structure allowing the factors to be named novelty, transaction efficiency, and user simplicity.

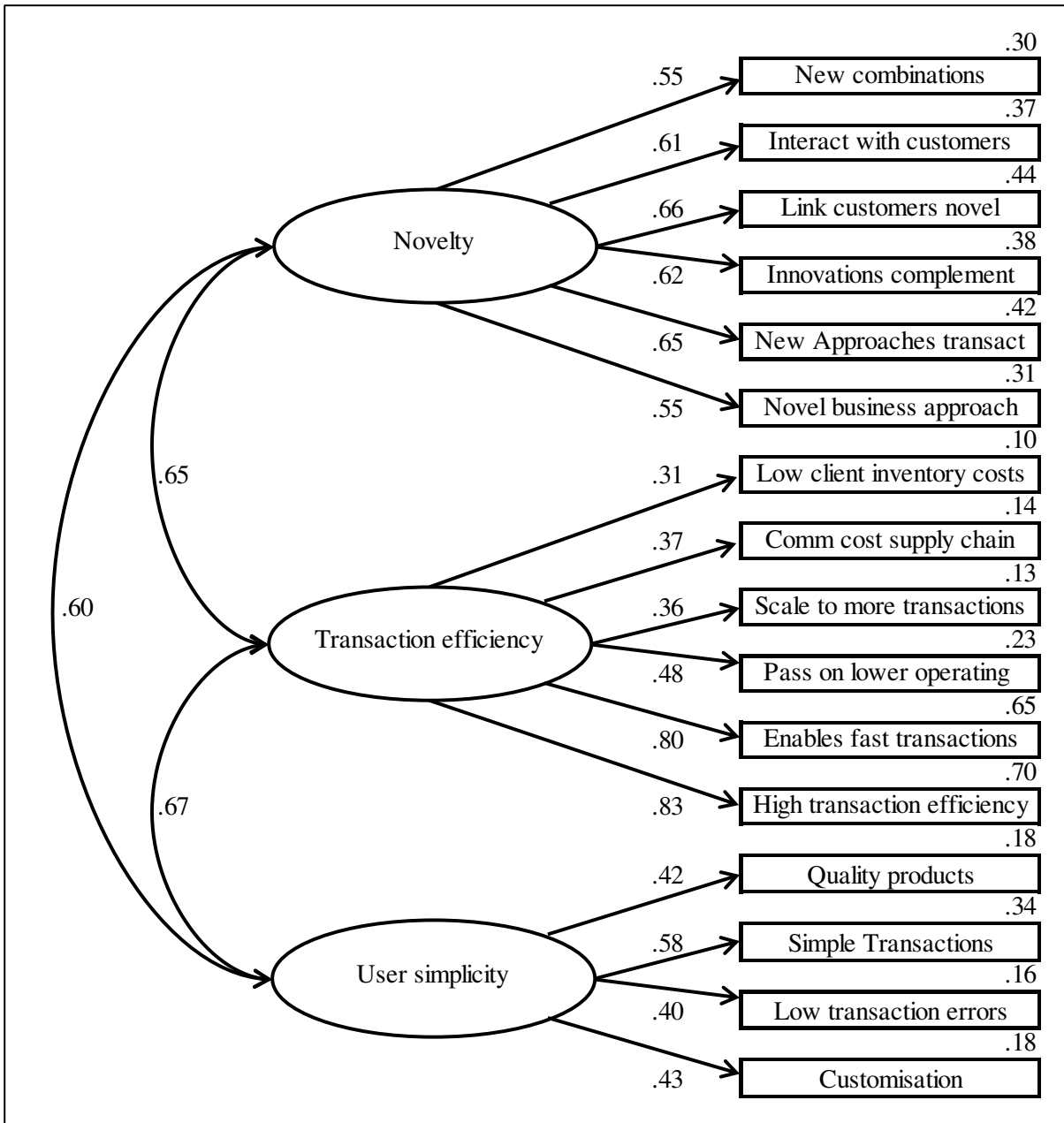
Our results differ from Zott and Amit (2007) in that design efficiency clearly fell into two factors, namely transaction efficiency and user simplicity (see Table 5.1 and Figure 5.4). Novelty business models were described by the ability of firms to offer new combinations of products, services, and information to customers, enabling customers and other stakeholders to access a wide variety of goods and services; and integration of innovations across areas. Transaction efficiency business models were described by scalability, scale efficiency of operating costs, passing on savings, and fast transactions. User simplicity business models were described by simple transactions from the user's point of view, low numbers of errors in the execution of transactions, and a high degree of customisation to clients. To calculate the final variables, we aggregated the item scores for each factor using equal weights (see Mendelson, 2000).

We tested internal consistency using a Cronbach Alpha reliability test. As shown in Table 5.1, two factors satisfied Nunnally's (1978) guidelines of 0.7, but the third was on the lower side of what others, such as Hair et al. (2010) see as acceptable.

**Table 5.1 Exploratory Factor Analysis — Pattern Matrix**

	Novelty	Transaction efficiency	User Simplicity
The firm offers new combinations of products, services, and information to customers.	.648		
The manner in which we interact and transact with customers and other stakeholders provides access to a wide variety of goods and services.	.782		
We link customers to our product and services in novel ways.	.707		
Innovations in one area are used to complement other parts of our operations	.387		
We continuously introduce new approaches in how we interact and transact with our customers and other stakeholders	.665		
Overall, the company's business approach is novel.	.544		
Inventory costs for customers and suppliers are reduced.		.486	
Marketing, sales and other communication costs for participants in our supply chain are reduced.		.387	
Our business is scalable to handle more transactions. Operating costs will decrease as scale increases.		.545	
We focus on lowering the operating cost of our business so we can pass these savings on to customers		.708	
Our business model or approach enables fast transactions.		.692	
Overall, the approach of this business offers high transaction efficiency.		.652	
We focus on providing best quality products and service rather than compete on price.			.538
Transactions are simple from the user's point of view.			.545
Our approach enables a low number of errors in the execution of transactions.			.698
The business provides a high degree of customisation to our clients			.408
Cronbach Alpha	.78	.69	.52

**Figure 5.4 Confirmatory Factor Analysis**



Therefore, to further demonstrate the internal validity of the measures, we ran confirmatory factor analysis using AMOS version 22. We tested the discriminant validity of these measurement models using the imputed correlations for the full measurement model. The results confirmed discriminant validity in that each item loads strongly on only the appropriate factor (see Table 5.2). Values for Cronbach’s Alpha (all above 0.70) showed that reliable scales can be constructed in all cases but one. The user simplicity scale has poor reliability (Cronbach Alpha = 0.52). However, this scale has acceptable face validity and internal validity, falling well inside the parameters suggested by Byrne (2001) (RMSEA = 0.032, CFI = 0.994, Chi-Square = 1.328, df =1, p =0.249).

**Table 5.2 Implied Correlations**

	<b>Transaction efficiency</b>	<b>Novelty</b>	<b>User simplicity</b>
The business provides a high degree of customisation to our clients	.250	.221	<b>.396</b>
Our approach enables a low number of errors in the execution of transactions.	.261	.231	<b>.414</b>
Transactions are simple from the user's point of view.	.422	.373	<b>.669</b>
We focus on providing best quality products and service rather than compete on price.	.326	.288	<b>.517</b>
Overall, the approach of this business offers high transaction efficiency.	<b>.722</b>	.529	.456
Our business model or approach enables fast transactions.	<b>.686</b>	.502	.433
We focus on lowering the operating cost of our business so we can pass these savings on to customers	<b>.493</b>	.361	.311
Our business is scalable to handle more transactions. Operating costs will decrease as scale increases.	<b>.390</b>	.286	.247
Marketing, sales and other communication costs for participants in our supply chain are reduced.	<b>.438</b>	.320	.276
Inventory costs for customers and suppliers are reduced.	<b>.371</b>	.272	.234
Overall, the company's business approach is novel.	.405	<b>.553</b>	.308
We continuously introduce new approaches in how we interact and transact with our customers and other stakeholders	.478	<b>.653</b>	.365
Innovations in one area are used to complement other parts of our operations	.456	<b>.622</b>	.347
We link customers to our product and services in novel ways.	.488	<b>.666</b>	.372
The manner in which we interact and transact with customers and other stakeholders provides access to a wide variety of goods and services.	.441	<b>.603</b>	.336
The firm offers new combinations of products, services, and information to customers.	.396	<b>.541</b>	.302

**Others:** We controlled for firm age and size, and industry sector, to account for the liabilities of newness and smallness (Edwards et al., 2005; Klomp & van Leeuwen, 2001; Lööf & Heshmati, 2006), and industry differences often observed in our variables (Hawawini, Subramanian & Verdin, 2003). We used a combination of self-reported numbers and data from official state government datasets acquired through compulsory employee insurance schemes for this purpose. Both the size and age variables were skewed, and therefore log-transformed to be included in regression models. Industry was recoded into four categories, based on data provided by respondents, namely, retail/wholesale (also including cafés and accommodation), manufacturing, services, and 'other' industries. The latter industry was left out of regression models as a reference category.

## **5.8 Analysis and Findings**

### **5.8.1 Main hypotheses**

As shown earlier, our final sample illustrated the success of our sampling strategy. Of the firms that responded, 30 per cent employed five or fewer FTEs (full time equivalent employees), 31 per cent between six and 20 FTEs, 13 per cent 21 and 50 FTEs, 14 per cent between 51 and 200 employees, and 11 per cent 201 or more employees. Seven per cent of firms had been established for five years or fewer, 16 per cent between six and 10 years, 39 per cent between 11 and 20 years, and 38 per

cent were 21 years or older. With a focus on tradable industries, fewer than 15 per cent of our sample had come from retail, wholesale, catering and accommodation. The almost 19 per cent from manufacturing and 32 per cent represented different types of services industries. Chi-square tests of difference indicated that there were significant differences in innovative activity in different types of firms. For example, smaller firms were less likely to innovate than larger firms, younger firms less likely to innovate than older firms, and industry innovation differed somewhat. This confirmed our decision to control for these variables.

Table 5.3 displays the Pearson correlations among the variables of interest. While some correlations exist between independent variables in our regression, we did not see this as presenting a multi-collinearity problem, as their variance inflation factors (VIF) are low (ranging from 1.167 to 1.476). Table 5.3 further indicated that there were significant correlations between most of our variables. Firm size was only correlated with innovation breadth, in that larger firms were more likely to innovate across a broad spectrum. Innovation breadth was also important for manufacturing firms, which most likely have to, for example, introduce new processes to ensure the success of new products.

**Table 5.3 Descriptives and Pearson's Correlations**

	Mean	Std. Dev.	Performance	Innovation breadth	Novelty BM	Transaction efficiency BM	User simplicity BM	Firm size	Age	Services	Manufacturing	Retail/wholesale	Other industries
Performance	4.4483	1.19088	1	.230**	.386**	.332**	.205**	-.012	.060	-.045	.048	.172**	-.123*
Innovation breadth	1.9182	2.99584	.230**	1	.296**	.273**	.197**	.137*	.050	.025	.111*	.064	-.162**
Novelty BM	3.6860	.67780	.386**	.296**	1	.494**	.378**	.080	.019	.112	.060	.095	-.226**
Transaction efficiency BM	3.7481	.74212	.332**	.273**	.494**	1	.361**	.066	.087	-.073	.073	.102	-.064
User simplicity BM	4.1330	.59019	.205**	.197**	.378**	.361**	1	.029	-.066	.112	.042	-.027	-.121*
Firm size	208.34	1266.779	-.012	.137*	.080	.066	.029	1	.094	-.021	-.005	-.047	.059
Age	23.9318	24.32741	.060	.050	.019	.087	-.066	.094	1	-.161**	.179**	.120*	-.078
Services	.3171	.46605	-.045	.025	.112	-.073	.112	-.021	-.161**	1	-.326**	-.282**	-.501**
Manufacturing	.1860	.38968	.048	.111*	.060	.073	.042	-.005	.179**	-.326**	1	-.198**	-.351**
Retail/wholesale	.1463	.35399	.172**	.064	.095	.102	-.027	-.047	.120*	-.282**	-.198**	1	-.304**
Other industries	.3506	.47789	-.123*	-.162**	-.226**	-.064	-.121*	.059	-.078	-.501**	-.351**	-.304**	1

BS: business model.

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

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

Table 5.4, Table 5.5 and Table 5.6 depict the OLS regression results, conducted using SPSS version 21. We ran several regression models to explore how innovation breadth and business model design themes combine to explain overall firm performance. First, as shown in Table 5.4, we investigated how innovation breadth (H1), as well as each of the three types of business model design themes (H2), related to perceived firm performance as a dependent variable. We first tested the relationship between innovation breadth and firm performance. H1 was found to be significant. In H2a, b, and c, all business model design themes were significant, confirming the hypothesised positive relationship with firm performance. We considered the effect sizes indicated that novelty design theme to explain most of the variance in firm performance followed by transaction efficiency and user simplicity design themes. When all three types of business models were entered simultaneously in H2, the user simplicity business model design theme was not significant.

**Table 5.4 OLS Regression: Hypotheses 1 and 2 — DV Firm Performance (Beta Shown)**

	Controls	H1	H2	H2a	H2b	H2c
Constant (b)	4.184***	4.132***	1.120 (.087)	2.124***	2.589***	2.320***
LnAge	-.092	-.087	-.068	-.068	-.092	-.075
LnSize	.256***	.215***	.183**	.197**	.206***	.245***
Services	.065	.029	-.015	-.021	.062	.023
Manufacturing	.072	.042	.022	.025	.059	.048
Retail/wholesale	.232***	.205**	.159*	.161*	.198**	.221***
Novelty BM			.238***	.333***		
Transaction efficiency BM			.143*		.279***	
User simplicity BM			.084			.202***
Innovation breadth		.175**				
R	.311	.353	.473	.445	.413	.369
R-square	.097	.125	.223	.198	.171	.136
Adjusted R-square	.078	.103	.197	.178	.150	.114
F	5.135***	5.668***	8.521***	9.837***	8.196***	6.261***

BS: business model; DV: dependent variable; OLS: ordinary least squares.

\*\*\*. Correlation is significant at the 0.001 level

\*\*. Correlation is significant at the 0.01 level

\*. Correlation is significant at the 0.05 level

Second, as shown in Table 5.5, we investigated how innovation breadth related to each of the three types of business models as dependent variables. In H3a, the novelty business model design theme was significant, as were the transaction efficiency and user simplicity design themes in H3b and 3c respectively.

Next we tested for mediation (H4) by following the steps prescribed by Baron and Kenny (1986). First, the direct effect between innovation breadth and firm performance was confirmed in H1 (see Table 5.4). Second, we showed that innovation breadth correlates with all three of the business model designs, as confirmed in H3 (see Table 5.5). Third, we tested for mediation by controlling for each of the business model design themes. The results in Table 5.6 confirm our mediation hypotheses (H4a, b and c), that business model design themes represent “generative mechanisms” through which innovation breadth is able to influence firm performance (Baron & Kenny, 1986, p. 1173). When controlling for novelty and transaction efficiency business model design themes, the innovation breadth coefficients do not reach conventional levels of statistical significance to indicate complete mediation. The user simplicity design theme partially mediates the relationship as evident in the difference between the regression coefficients in the direct and controlled regression models (0.175 and 0.141). We also used an alternative ‘bootstrap’ test of the indirect effect, by running Preacher and Hayes’ (2004, 2008) SPSS syntax, which confirmed the above mediation results (the full results are not reported here). This test is regarded to be more powerful than the Byron and Kenny (1986) tests as well as their recommended Sobel’s z-test (Zhao, Lynch & Chen, 2010). Last, we ran the full model with all three types of business model designs and innovation breadth included as independent variables. Interestingly, only the novel business model design was significant at five per cent level. Therefore, all the analyses confirm the mediatory effect of the novelty design theme on innovation breadth as well as its dominance in explaining firm performance variance.

**Table 5.5 OLS Regression: Hypothesis 3 — DVs Novelty (H3a), Transaction Efficiency (H3b), and User Simplicity (H3c) BM Design Themes (Beta shown)**

	Controls	H3a	Controls	H3b	Controls	H3c
Constant (b)	.326**	.3**	3.448***	3.414***	4.122***	4.102***
LnAge	-.046	-.044	.014	.017	-.057	-.056
LnSize	.029	.012	.068**	.045	.020	.007
Services	.252**	.189*	.019	-.063	.266**	.219*
Manufacturing	.030	-.036	.094	.010	.184	.135
Retail/wholesale	.177	.111	.262	.178	.110	.061
Innovation Breadth		.046***		.059***		.034**
R	.246	.378	.223	.331	.214	.285
R-square	.060	.143	.050	.11	.046	.081
Adjusted R-square	.041	.122	.030	.088	.027	.058
F	3.151**	6.768***	2.559*	5.012***	2.362*	3.586**

BS: business model; DV: dependent variable; OLS: ordinary least squares.

\*\*\*. Correlation is significant at the 0.001 level

\*\* . Correlation is significant at the 0.01 level

\*. Correlation is significant at the 0.05 level



**Table 5.6 OLS Regression: Hypothesis 4 (mediation) — DV Firm Performance (Beta shown)**

	H4a	H4b	H4c	Full Model
Constant (b)	2.245***	2.710***	2.517	1.283 (.056)
LnAge	-.067	-.089	-.073	-.067
LnSize	.178**	.185**	.214***	.171**
Services	-.035	.039	-.001	-.026
Manufacturing	.010	.041	.027	.012
Retail/wholesale	.151*	.184**	.201**	.152*
Novelty BM	.309***			.228***
Transaction efficiency BM		.252***		.132 (.054)
User simplicity BM			.176**	.077
Innovation breadth	.100	.112 (.079)	.141*	.071
R	.455	.426	.392	.477
R-square	.207	.181	.153	.228
Adjusted R-square	.183	.157	.128	.198
F	8.855***	7.530***	6.156***	7.727***

BS: business model; DV: dependent variable; OLS: ordinary least squares.

\*\*\*. Correlation is significant at the 0.001 level

\*\*. Correlation is significant at the 0.01 level

\*. Correlation is significant at the 0.05 level

### 5.8.2 Robustness tests

To ascertain if an alternative model of mediation could also explain our data, we conducted an alternative test of mediation. Baron and Kenny's (1986) four-regressions test for mediation were therefore repeated. Even though H1 and H2 were discussed above, we had to develop two alternative hypotheses for H3 and H4.

Because these alternatives find support in the literature, this robustness test was important. For example, business model design theme choice, as also related to competitive strategy, may require, dictate and initiate innovation of the business model elements. The business model thus also acts as a locus of innovation (Amit & Zott, 2001; Zott & Amit, 2007). Alternative hypotheses of business model choice as a source of innovation of the business model elements in reconfiguring organisational structure (George & Block, 2011) should therefore also be tested, namely that:

*Hypothesis A3: The novelty (HA3a), transaction efficiency (HA3b) and user simplicity (HA3c) business model design themes are positively associated with innovation breadth.*

Similarly, the direction of the relationship depicted in H4 may be different in that adopting a dominant business model design theme may dictate innovation activities at the business model level, ultimately leading to performance benefits. We could therefore hypothesise that:

*Hypothesis A4: The positive association between the novelty (HA4a), transaction efficiency (HA4b) and user simplicity (HA4c) business model design themes and perceived firm performance is mediated by innovation breadth (innovations within the business model).*

Supplementary multiple regression analyses were done to test the alternative hypotheses. We report these results briefly, not fully, for parsimony sake. The analysis confirmed hypotheses HA3a, b and c in finding that, individually, all three design themes significantly (at the 0.01 level) correlated with innovation breadth. When they were combined in one regression, the user simplicity design theme was non-significant while both novelty and transaction efficiency were significant (at the 0.05 level). Further supplementary mediation analyses (similar to that used to test the main hypotheses) rejected HA4, indicating that innovation breadth did not act as mediator for any of the three relationships (HA4a, b and c). In addition, we also tested for potential moderation of business model design themes on the innovation breadth–performance relationship as suggested by Baden-Fuller and Haefliger (2013). Our findings suggest that no moderation was evident for any of the three business model designs as none of the interaction variables were significant in multivariate regressions.

## **5.9 Discussion**

Our research contributes to theory and practice in a number of ways. First, we show that, although the link between innovation and firm performance is not straightforward, managers who make coherent choices in the context of business model design are much better at realising the performance benefits of innovation (Amit & Zott, 2012; Baden-Fuller & Haefliger, 2013; Zott & Amit, 2007). The corollary of this is that innovation without clarity in the business model leads to modest or negligible performance outcomes. Innovative companies succeed when they align multiple innovations with value-creating outcomes for particular groups of customers (Spencer, 2013).

Second, linked to this, we confirm the positive impact of innovation breadth on performance as established in previous research (Gronum et al., 2012). We also introduce the concept of *innovation breadth* as a proxy for *innovation within the business model* and illustrate its association with different business model design themes. Innovation within the business model refers to the introduction of any combination of innovation forms across the business model elements. Firms that are active in designing business models centred on the value themes of novelty, transaction efficiency, and user simplicity are found to also engage in innovation across the elements of their business models. The association between innovation breadth and the novelty business model value

theme is most pronounced, suggesting that, when a business focuses on novelty as the primary value driver in designing their business models, such novelty tends to innovate more broadly.

Third, we also illustrate how different business model designs vary in their importance for performance. Business model design unlocks the firm's performance benefits vested in the other forms of innovation. Building on the work of Zott and Amit (2007), we therefore contribute to the ongoing theoretical debate on the nature of business model innovation. Innovation within the business model that extends across a broad array of business model elements will positively affect firm performance once included within a business model designed to focus on specific value themes. The novelty business model design theme, as a mechanism for unlocking the performance benefits of innovation breadth, dominates among the design themes investigated. Although not directly tested, our results seem to confirm Zott and Amit's (2007, p. 194) finding suggesting the existence of "diseconomies of scope in design; that is, [those] attempting to emphasise both efficiency and novelty in the design of a business model, may be costly and could affect performance." We find that, although the three design themes are positively associated with firm performance on an individual basis, only the novelty and, to a lesser extent, transaction efficiency themes are significant when controlling for all three themes in the regression (Zott & Amit, 2008). This indicates a potential trade-off between the design themes, thus implying that managers should focus their business model design and innovation efforts on the novelty value theme and, to a lesser extent, the transaction efficiency theme. In this regard, we also show that business model design does not require radical, discontinuous and game-changing innovation to positively affect firm performance, a view commonly held by practitioners (Bock et al., 2012). Incremental innovations can positively impact on firm performance (Amit & Zott, 2012) if they are coherent with business model design themes.

Our study is not without limitations. First, we acknowledge the role that common method bias, stemming from the use of single respondents, may have on the results. However, in multivariate linear relationships, common method bias generally decreases when additional independent variables are included in a regression equation (Siemsen, Roth & Oliveira, 2010). In this study, there are four independent and five control variables, suggesting that common method variance has been somewhat addressed through the analysis. Second, the cross-sectional design prevents us from examining change in the business models, which would be necessary to conclusively show business model innovation where the value theme changes. To test causality and change, we would need longitudinal data, which would be an important next step for this line of research (Aspara et al., 2010). Third, our data come from tradable industries in one urban area within Australia. While there is no reason to argue that firms in other urban areas would respond

differently to our survey, rural firms, or even firms from other industries may. We are therefore careful not to claim broader generalisability of our results.

This research has shed light on the performance impact of design themes but did not extend to include business model innovation. Inconsistency regarding the business model innovation concept hampers the development of empirical measures (Aspara et al., 2010; George & Bock, 2011; Giesen, Riddleberger, Christner, & Bell, 2009; Johnson et al., 2008; Lambert and Davidson, 2013). Further research should be directed at delineating the conceptual lines between business model innovation and strategy. Business model innovation as creative (re)configuration of the elements of the business model is aimed at improving, creating or redefining the dominant logic within firms as well as the industry they operates in. Business model innovation is therefore not the same as innovation within the business model as the former has a strategic outward market focus aimed at creating competitive advantage by exploiting opportunities (Bock et al., 2012). To develop an effective operationalisation of business model innovation, a proxy is required that extends to both the firm and industry, or market level of analysis.

## **5.10 Conclusion**

This paper set out to understand how firms use business model design and innovation in business models to underpin performance. We contribute to the existing debate by showing first, while firms prefer business model designs that focus on user simplicity, those that are improving transaction efficiency or novelty are best able to improve performance. Second, and perhaps most important, our findings illustrate the importance of business model design for innovation. While regression results show that innovation matters to performance, once it is mediated by an appropriate business model design, its value is enhanced and unlocked within the firm's activity and transaction architecture. While we noted some limitations to our study above, we believe that we have taken an important step in connecting the business model concept to established constructs and measures of business innovation, and thus created a more solid foundation for the future development of the 'business model view of the firm'.

## **6. SUMMARY OF CONTRIBUTIONS AND CONCLUSIONS**

### **6.1 Introduction**

The preceding four chapters each considered how different business processes relate to SME performance, with innovation being central to the research designs of the last three studies undertaken. This chapter summarises the theoretical and practical contributions of this thesis after integrating the findings of the preceding studies. Using a computer assisted text analysis program called Leximancer, Study One identified the details about SME growth and performance found within the broader academic literature. This study found innovation breadth and networks as two dominant concepts in the literature but also that varied methods and inconsistent findings were limiting this field of study from progressing. The absence of the use of the business model was surprising given the recent increased scholarly interest in business model design and innovation as promising avenues through which SMEs create and sustain competitive advantage. These findings showed that the SME performance literature did not include advances observed in the broader innovation field. Responding to these gaps, and using the resource-based, dynamic capabilities, evolutionary economics and social capital theories, Studies Two, Three and Four proceeded to investigate how a unified measure of innovation (termed here innovation breadth), networking and business model design relate to SME performance. Building on calls (Clifton et al., 2010; Maurer et al., 2011) for more nuanced studies of these relationships, these studies built and tested models to investigate the moderating, mediating and quadratic relationships between the constructs of the models. This chapter next discusses the main findings and illustrates how the different study models together form a comprehensive thesis research framework. Contributions made to theory and practice are then highlighted. The chapter concludes with an outline of the limitations and further research avenues.

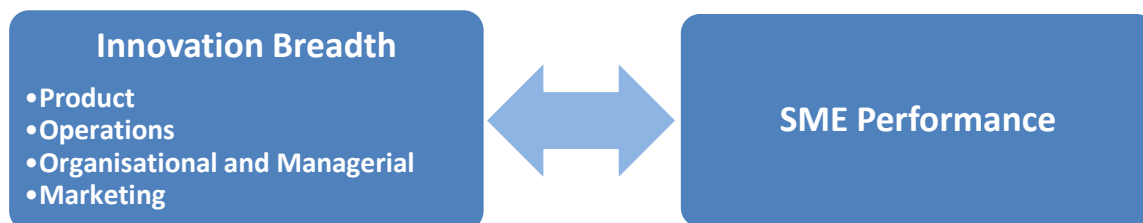
### **6.2 Overview of Main Findings and Integrated Thesis Research Framework**

As explained above, Study One's review of the theories underpinning SME performance (see Appendix A) provided a starting point for a computer aided systematic review of the SME growth and performance literature. It also provided the basis for the design of the research models tested in the subsequent studies.

Study Two presented the theoretical foundation of innovation breadth as typology and investigates the linearity, directionality, temporality and contextual nature of the innovation breadth

– performance relationship depicted in Figure 6.1. It found a mutually beneficial, reciprocal relationship between innovation breadth and SME performance. This reciprocity was confirmed over four consecutive linear regressions with a one-year lag (2006 with 2007, 2007 with 2008, 2008 with 2009 and 2009 with 2020). Also confirmed was the inverted U-shape relationships between innovation breadth (2006) with subsequent years of performance (2007 to 2009), using quadratic regressions. This confirms the hypothesis that innovation breadth advantages to firm performance is finite, with initial benefits in increasing the variety of innovation that SMEs introduce turning into a detrimental relationship with performance when innovation diversity is overextended beyond an optimal point. In addition, the effect sizes of regressions also decline over time, indicating that the positive relationship of innovation breadth with performance is highest in the near term (one year) and robust for up to three years after implementation. Investigating the dynamics of this relationship also provided no evidence of previously uncovered, lengthy intervals ranging from two to 10 years (Audretsch, 1995; Freel & Robson, 2004), between innovation implementation and performance outcomes in that innovation breadth had a positive relationship with performance one year after implementation. Taken together, these results suggest that persistent implementation of moderate levels of innovation breadth would optimise SME performance.

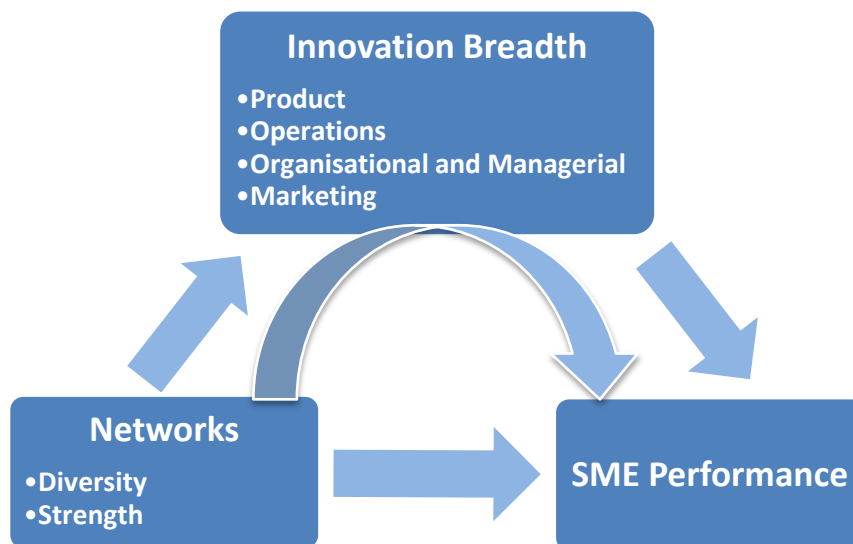
**Figure 6.1 Study Two Model: The Innovation Breadth and SME Performance Relationship**



Once the relationship between innovation breadth and performance was uncovered, the focus of inquiry shifted to the impact of social capital in network ties, identified as an important concept in the SME growth and performance empirical literature. Study Three builds on the findings of Study One and clarified the contribution of networks to innovation breadth and SME performance (see Figure 6.2). In fact Study Three showed that strong, heterogeneous network ties improve innovation breadth in SMEs. It also confirmed the importance of the social capital within network ties to SME performance. The positive relationship of networks with performance is, however, small and tends to diminish over time. The connections between network ties and SME performance were more

complex than previously thought, as this relationship was mediated by innovation breadth, which is therefore proposed to be one of a number of intermediate outcomes that act as conduits through which the performance benefits of network ties are unlocked.

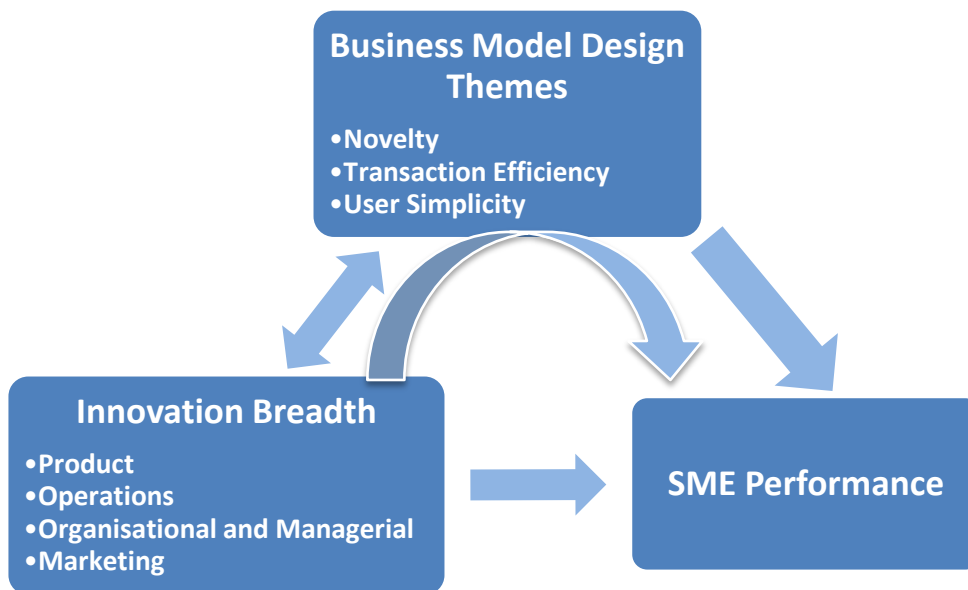
**Figure 6.2 Study Three Model: Network, Innovation Breadth and SME Performance Relationships**



The thesis then shifted focus to uncovering another intermediate business process, business model design, as a relatively new construct that is receiving increased attention in the strategy literature. The importance of business model design and innovation to firm performance is theoretically proposed (Amit & Zott, 2001; George & Bock, 2011; Zott & Amit, 2007), yet no studies clarify these relationships within the sample of empirical studies on SME growth and performance investigated in Study One. Study Four addressed this gap in the literature by distinguishing between innovation within the business model (conceptualised as innovation breadth) and business model design themes to determine their relationship with SME performance. Study Four empirically tested the model depicted in Figure 6.3 to confirm the positive relationship between innovation breadth with SME performance that was found in Studies Two and Three although using a different sample of Australian SMEs from the greater Brisbane metropolitan area. Significantly, positive relationships in both directions between innovation breadth and all three business model design themes were established, as indicated by the double pointed arrow in Figure 6.3. This finding implies that greater innovation breadth was associated with all three business model design themes and that firms engaged in business model design based on any one of the three design themes

tended to also innovate more broadly. The model depicted in Figure 6.3 identified important nuances in how innovation breadth related to SME performance in that business model design based on the novelty and transaction efficiency themes, mediated this relationship. This finding highlights that SMEs need to design their business models centred on the value themes of novelty and transaction efficiency to bring about performance benefits from the innovation across the elements of their business models, with the novelty theme being the most pronounced.

**Figure 6.3 Study Four Model: Innovation Breadth, Business Model Design and SME Performance Relationships**



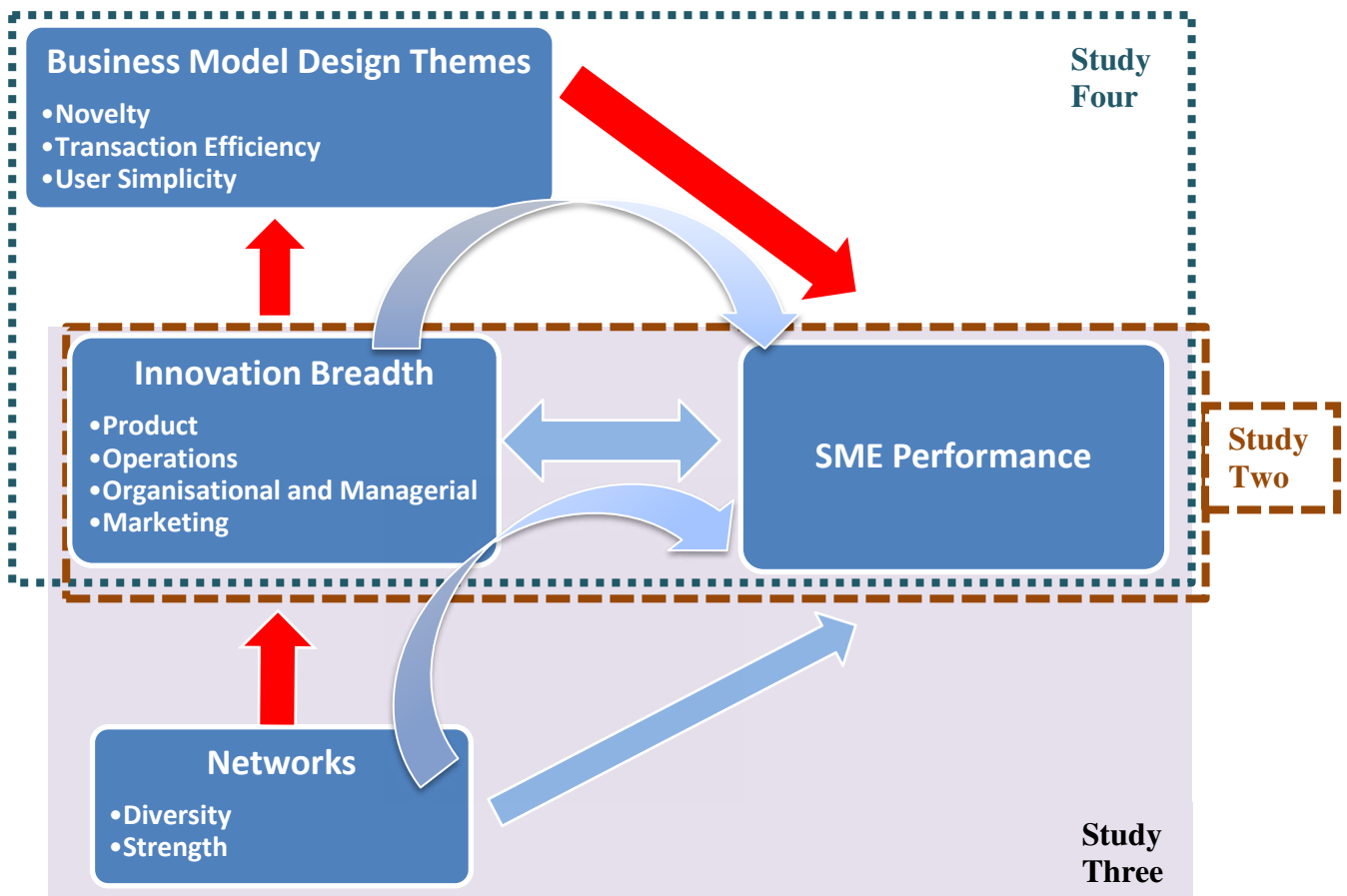
Integrating the empirical models of the three studies depicted in Figure 6.4 illustrates all the relationships empirically tested and validated in this thesis. It has to be noted that these relationships were tested in isolation with different databases and considering the cross-sectional design of Study Four. The potential exists that when this combined model is subject to simultaneous statistical analysis in a longitudinal design the relationships of the individual studies may not hold precisely. Analysis of this integrated model therefore recommends future research, as discussed in Section 6.5.

The present thesis' integrated research framework illustrates the complex direct and indirect relationships of the three primary independent variables with SME performance and proposes that the primary direction of these relationships follows the path indicated by red arrows in Figure 6.4. After combining the findings of Studies Two, Three and Four, the overall proposition of this thesis can be summarised as follows:



Maintaining strong heterogeneous network ties will improve SME performance only when the social capital embedded in such network relationships supports innovation breadth. Persistent implementation of moderate levels of innovation breadth would optimise SME performance, but the value of such innovations would only manifest itself if the innovation occurs within a coherent business model, designed around the novelty or transaction efficiency themes as primary value drivers.

**Figure 6.4 Integrated Thesis Research Framework: Networks, Innovation Breadth, Business Model Theme and SME Performance Relationships**



Given the summary of findings, it is prudent at this point to discuss the contributions of this thesis to the theory and literature.

## **6.3 Contributions to Theory**

### **6.3.1 Summary of main contributions**

The theoretical contribution of this thesis comes from addressing how innovation, networking and business model design are understood in SME performance. The broader innovation and strategy literature (Damanpour & Evan, 1984; Gopalakrishnan, 2000; Kleinschmidt & Cooper, 1991; Wong et al., 2007), after taking their cue from how large firms operate, take a linear view through which more innovation is seen to improve performance. Where SME researchers have used these theories to inform their models of SME performance, it has led to mixed results. This approach was questioned in this thesis, which rather developed and tested SME appropriate models. As such, the results presented here, firstly, provide evidence of the value that intangible resources have for SMEs because they have limited physical and slack resources (Anderson & Eshima, 2013). Intangible resources such as social capital and technological capital or competence (including the creation and adoption of innovations) (Anderson & Eshima, 2013; Fernandez, Montes, & Vázquez, 2000; Lee, 2010) are therefore indispensable for SMEs in building sustainable competitive advantage (Newbert, 2007). This thesis not only highlights the importance of such intangible resources (Study One) but also provides evidence of its positive association with SME performance (Study Two and Three).

The second major contribution of this thesis is in establishing that it is not only possession, but rather the use of such intangible resources and capabilities that deliver value to SMEs. This thesis thus addresses criticism levelled against RBT, social capital theory, and network literatures for not accounting for the intermediate business processes that translate resources into firm performance. This thesis view the capability to innovate across a broad range of business activities (Lawson & Samson, 2001) and business model designs (Eden & Ackermann, 2000; Desyllas & Sako, 2013; Teece, 2007) as high level strategic dynamic routines or dynamic capabilities (Cavalcante, Kesting & Ulhøi, 2011). It has thus produced a more nuanced explanation of the mechanisms (and inter-relatedness of these mechanisms) as they interact with SME performance. Innovation breadth in Study Three is proven to be a mechanism that unlocks the performance benefits of networks and, in turn, business model design is recognised to unlock the performance benefits of innovation breadth (or innovation within the business model) in Study Four.

Third, the importance of ‘focus’ as a key theme is demonstrated by this thesis. To establish and maintain networks are costly and time-consuming. Similarly, to implement different types of innovation and to undertake business model design are risky endeavours for SMEs. Resource constrained SMEs with limited administrative capacity should therefore limit their strategy by:

focusing their innovation activities, and thus not overextend their innovation breadth (see Study Two); focussing on network relationships that foster innovation breadth which in turn translates to higher performance (see Study Three); and focussing their business model design around either novelty or efficiency because innovation breadth is rarely considered by researchers. However, it freshly contributes to theory and methodology because it accounts for the risks associated with SME innovation diversity (given their resource and strategy variety constraints). Innovation breadth is also argued to be an original proxy for measuring innovation within the business model.

The fourth, major contribution of this thesis entails improving the understanding of the temporal issues that SMEs have to consider as they attempt to maximise long-term performance benefits from networking and innovation. This understanding remains limited because of the plethora of cross-sectional studies in the field (Bergenholtz & Waldstrøm, 2011; Bowen et al., 2010; Löf & Heshmati, 2006). Study Two also supports the evolutionary economic argument that innovation provides only temporary advantages (Nelson & Winter, 1982a) in that SMEs need to continually innovate to counteract the diminishing performance returns from moderate levels of innovation breadth over time.

Besides these general contributions, what follows demonstrates the more specific contributions of this thesis.

### **6.3.2 Resource-based theory (RBT) and dynamic capabilities theory**

Specifically, this thesis contributes RBT and the dynamic capabilities theory by firstly confirming that intangible resources and capabilities, associated with social capital, innovation and business model design are valuable to SME performance. Furthermore, this thesis also provides evidence for the manner in which innovation breadth and business model design combine as high level strategic dynamic routines or dynamic capabilities (Cavalcante, Kesting & Ulhøi, 2011) to create competitive advantage. In essence, RBT attributes performance differences between competing firms to differences in their resources endowment (Madhok, 2002; Peteraf & Barney, 2003). Firms therefore comprise unique bundles of resources (including physical and knowledge based assets) (Penrose, 1959). Firms perform using a process through which they acquire, develop and adapt inimitable, valuable, and unique resources and capabilities to build and sustain competitive advantage (Wernerfelt, 1984; Barney, 1991; Dierickx & Cool, 1989). Intangible resources and the business processes that exploit them are less imitable and provide the basis for more sustainable competitive advantage (Ray et al., 2004).

Study Three supports the RBT idea that networks provide SMEs access to external resources (Penrose, 1959; Wernerfelt, 1984) and facilitate the creation and exploitation of social capital which

in itself is regarded as a source of competitive advantage (Barney, 1991; Florin et al., 2003; Nahapiet & Ghoshal, 1998). Study Three further provided empirical evidence that sustainable competitive advantage does not automatically stem from the possession of resources but requires business processes that translate them into sustainable competitive advantage (Newbert, 2007). This occurs because network ties contribute to SME performance only through stimulating innovation breadth. This finding shed light on a substantial gap in RBT in that it does not adequately clarify the resource-related business processes that exploit firm resources in creating sustainable competitive advantage and subsequent performance (Kraaijenbrink et al., 2010; Simon, Hitt, Ireland & Gilbert, 2011). This was further supported by Study Four, which introduced business model design as another intermediate performance process that enables the performance benefits of innovation breadth.

This thesis also contributes to the dynamic capabilities theory, and newer developments in the broader RBT (Helfat & Petraf, 2003). The dynamic capabilities theory addresses the gap in RBT by accounting for the business processes that change a firm's resource configurations and market positions (Di Stefano, Peteraf & Verona, 2014; Eisenhardt & Martin, 2000; Teece, 2014; Zott, 2003). This contribution involved ascertaining that SMEs' ability to develop network ties and innovate across business functions may act as dynamic capabilities (Teece, 2007). In this case, the ability to build strong diverse networks provides SMEs with access to resources, including knowledge and skills, to improve innovation breadth that in turn positively relates to performance. Similarly, an SME's ability to innovate across the elements of its business model is used to reconfigure its resources as manifested in its business model design. Performance benefits are evident if these innovations within the SME's business model are centred on dominant business model design themes. It further illustrated that it is not a simple linear or single mediatory relationship and that the paths through which resources and dynamic capabilities impact upon performance are indeed complex, especially with regards to innovation. Innovation breadth acts as a mediator for networks but at the same time is dependent on a coherent business model design to ensure performance benefits. The innovation breadth and performance relationship also displayed characteristics of reciprocity and non-linearity. This emphasis of RBT and dynamic capabilities theory is an important advance in how dynamic capabilities are understood in a SME context and provides further evidence that network ties and innovation breadth (as exemplifying past investments and routine repertoires) dictate and constrain future behaviour, including business model design (Teece et al., 1997).

RBT is also criticised for its lack of applicability to SMEs (Connor, 2002), most likely because SMEs lack market power, making the development of strategic resources unlikely. This

thesis differs, arguing that SMEs are able to dominate geographic, product or service niches (or “interstices” according to Penrose, 1959, p. 222) by developing competitive advantage in using bundles of both physical and intangible resources. Both network ties and innovation breadth as explanatory variables of the integrated thesis model (Figure 6.4) are associated with intangible resources, including social capital, tacit knowledge, and innovation capacity. Such intangible assets are confirmed in this thesis to have great strategic potential for SMEs (Ray et al., 2004; Barney, 1991). SMEs lacking physical resources could therefore still develop competitive advantage by relying heavily on leveraging their superior intangible resources (Coleman et al., 2013).

Last, Penrose (1959) argues that firm performance and growth are dependent on the firm’s effectiveness in expanding its administrative efficiency. SMEs with limited administrative capacity and resources should therefore focus their efforts by limiting strategic variety (Geroski et al., 1993). Study Two confirmed this in finding diminishing and negative performance returns associated with greater innovation breadth. The findings further suggested that such negative returns may be mitigated by increased firm size. As firms grow they build resource slack including increased administrative capacity, financial, human and social capital that is required to successfully implement different types of innovation simultaneously. Study Four also supports this with evidence that innovations within the business model should be implemented by focussing on specific business model design themes. Focus is therefore a central theme for enhancing an SME’s administrative efficiency and the benefits of focus are also evident when interpreting the thesis findings from an evolutionary economic perspective, discussed next.

### **6.3.3 Implications for evolutionary economics**

The evolutionary theory of economic change was developed by adopting elements of Darwinian evolutionary biology and Schumpeterian innovation-based economic theory (Nelson & Winter, 1982b). Product and firm diversity drive economic evolution and growth similar to the process of biological evolution (Llerena & Zuscovitch, 1996). Two contributions to evolutionary economics are noted:

First, at the firm level, Study Two confirmed that innovation diversity, representing changes in routines or new combinations of routines, positively relates to firm performance. Argued from the evolutionary economic perspective, greater innovation breadth increases variety, which in turn makes SMEs more adaptable to their competitive environment. As the competitive environment changes firms are compelled to change their routines. However, in line with evolutionary economics’ reasoning, such changes are risky for SMEs because their scope in changing routines is

limited, as confirmed by finding that the innovation breadth – performance relationship is best represented by an inverted U-shape in Study Two.

Second, evolutionary economics (Nelson & Winter, 1982a, 1982b) argues in line with Schumpeterian thought that innovation creates temporary monopoly positions within the market. To sustain the rents so derived firms are required to continually innovate. The results of Study Two longitudinally illustrate that this is indeed the case as the returns to innovation breadth diminished over time. What is however disputed in this thesis is the emphasis Schumpeter (1950) places on revolutionary change based on intense technological and organisational innovation. Although the economic growth potential stemming from radical innovation in the Schumpeterian ‘creative destruction’ narrative is not disputed by this thesis, it is evident from the results of this thesis that such radical and novel innovations are not a prerequisite for enhancing performance at the firm level. This thesis provides evidence that the sustained introduction of innovations that are novel at the level of the focal firm and hence regarded as incremental innovations are sufficient for improving SME performance.

While innovation is central to evolutionary economics, it is also informed by a number of other theories, as shown next.

#### **6.3.4 Contribution to the innovation literature**

Although the innovation literature has amassed a large volume of knowledge, it is still marred by inconclusive empirical findings as well as uncertainties and contradictions regarding the nature and role of innovation as complex and varied phenomena. Definitive conclusions about the innovation – performance relationship in SMEs have not been reached (Rosenbusch et al., 2011). This thesis therefore sheds light on this relationship in five ways:

First, the breadth of focus of innovations across multiple innovation domains has received very little attention (Love et al., 2011). This thesis contributed to the innovation literature by developing innovation breadth as a unique proxy that represents a more accurate conceptualisation of how innovation is captured in most Community Innovation Surveys. Innovation breadth has the potential to address the problem with seemingly contradictory findings by making direct comparisons of different study results possible.

Second, most empirical studies provide little guidance on how innovation relates to SME performance over time because of their cross-sectional designs (Mansury & Love, 2008; Prajogo, 2006). Study Two provided insight into the length of potential performance returns and lags in this relationship by showing that innovation continues to impact upon performance but at diminishing rates. Study Two also showed both that the performance impact of innovation breadth is immediate

and that no evidence of lengthy performance lags of innovation breadth is available. Third, closely related to the previous point on temporality, is the debate on continual versus intermittent innovation among SMEs. This is clarified by providing clear evidence in favour of the former.

Fourth, this thesis questioned the implicit pro-innovation bias of the innovation literature. It showed that, in line with RBT and evolutionary economic thinking, SME innovation is risky and that innovation breadth should be limited. Diminishing and negative performance returns from increased innovation breadth therefore compels SMEs to adopt moderate levels of innovation breadth. Finding an inverted U-shape relationship between innovation breadth and performance therefore challenged conceptions of a simplistic, positive linear relationship between innovation and SME performance (Bhaskaran, 2006; Hsueh & Tu, 2004; Morone & Testa, 2008). Last, Study Three informed the debate on the benefits of open innovation by showing diverse, strong network ties to be a solution to SME resource limitations by improving innovation breadth, as discussed in Section 6.3.6.

One type of innovation that has received increased attention in academic literature is business model innovation. The associated nascent business model view remains ill-defined with blurred construct boundaries, and is in need of empirical evidence to justify its increased prominence within the innovation, strategy and entrepreneurship literature. The contribution of this thesis to the business model view is discussed next.

### **6.3.5 Implications for the business model view**

Although there is still no agreement on the exact nature of a business model, most scholars tend to agree that the business model represents the dominant logic of how a firm does business in creating, delivering and appropriating value (Chesbrough & Rosenbloom, 2002; Osterwalder & Pigneur, 2010; Teece, 2010; Zott & Amit, 2010). As such a firm's business model is crucial to its performance and sustainability. Because the business model directly relates to organisational development and performance, it is increasingly debated within the strategy, innovation and entrepreneurship literature. Study Four of this thesis contributed to the development of the business model view of the firm in four of ways:

First, it provided a comprehensive definition of the business model construct in an attempt to converge existing conceptualisations. The boundaries between strategy and the business model are also blurred. Study Four argued that although they share commonalities, the business model view is different to business strategy. The business model is more generic than business strategy in that it does not incorporate competitive positioning. The business model can be seen as a static abstraction of the firm's business strategy.

Second, an integrated theoretical framework was presented by building on the work of Osterwalder and Pigneur (2010), Spencer (2013) as well as Zott and Amit (2007) to connect the business model concept with existing constructs and measures of business model design. Innovation breadth was used to represent innovation within the business model whereas business model design themes were used to represent the enactment of business strategy. The study therefore better clarified the mechanics and processes of business model design and innovation (George & Bock, 2011; Johnson et al., 2008) by investigating the complex two-way relationship between innovation and business model choice (Baden-Fuller & Haefliger, 2013) as well as their impact on SME performance. It therefore valuably contributed by presenting empirical evidence on how innovation within the business model (that extends across the elements of the business model) related positively to firm performance, but only when encapsulated within a business model design that focuses on specific value themes. The main contribution of Study Four to the business model view therefore lies in the clarity it provided to the controversy surrounding the complex paths to monetization that links innovation, the business model, and business performance.

Third, by differentiating, and showing the relations that exist between innovations within the elements of the business model, business model design and performance, this thesis laid the foundation for further studies on business model innovation as discussed in Section 6.6. Study Four therefore contributed to the ongoing theoretical debate on the nature of business model innovation. It highlighted that innovation breadth is associated with business model redesign but that such redesign does not necessarily constitute business model innovation. There are therefore distinct differences between these three constructs, and although they may be interdependent, they should be conceptualised in a way that explicitly delineate their boundaries.

The last contribution of Study Four is showing that business model design does not require radical, discontinuous and game-changing innovation to positively affect firm performance, a view commonly held by practitioners (Bock et al., 2012). Incremental innovations were shown to relate positively to firm performance (Amit & Zott, 2012), but only if they are implemented in combination with coherent business model design themes.

### **6.3.6 Implications for network and social capital theories**

Network research at the firm level primarily investigates the performance benefits of networks (Ozman, 2009). Social capital includes all the resources that are embedded in network relationships (Burt, 1997; Coleman, 1990; Nahapiet & Ghoshal, 1998). The innovation literature generally agrees that social capital, innovativeness and SME performance are positively related (Pittaway et al., 2004; van Wijk et al., 2008). Nevertheless, two controversies remain:



First, although social capital is seen as a solution to having limited resources, how SMEs use networks as part of open innovation remains uncertain (Lee et al., 2010; Lichtenthaler, 2008; van de Vrande et al., 2009). The manner that the structural and relational dimensions of social capital embedded in networks relate to innovation breadth is also unclear. Therefore Study Three provided evidence that both the structural (i.e., heterogeneous ties) and the relational (i.e., strong ties) social capital enhanced the broad-range implementation of innovation or exploitation (Ahuja, 2000; Burt, 2004; Hansen, 1999; Kleinbaum & Tushman, 2007; Lee et al., 2010; March, 1991; Pirolo & Presutti, 2010; Rogers, 2004; Zeng et al., 2010). Networks therefore assist SMEs to obtain advantages of larger size by providing them with more access to resources, complementary skills, capabilities and knowledge.

Second, the main gap in social capital theory and network literature occurs because empirical evidence of the relationship between social capital and SME performance is inconclusive because it does not cover the intermediate business processes that would translate social capital derived from network ties into SME performance (Clifton et al., 2010; Maurer et al., 2011). This is directly related to the theoretical gap that was identified in Section 6.3.2. Study Three therefore adds to social capital theory and the network literature as well as RBT and dynamic capabilities theory, by showing that innovation breadth mediated the relationship between social capital embedded in networks and SME performance. Innovation breadth therefore acts as an intermediate business process through which the benefits of social capital in networks are unlocked.

In addition to the theoretical implications of this thesis' findings, it also provides important advice to SME owners, managers, consultants, and policy makers as summarised next.

#### **6.4 Contributions to Practice**

The most important contribution to practice of this thesis is that it advises practitioners about strategic focus, in that SMEs should purposefully apply their limited administrative capacity and intangible resources to support business performance. This involves leveraging intangible assets (including social capital and innovativeness) to build sustainable competitive advantage and designing effective value driven business models. This thesis also clarifies the manner in which network ties, innovation breadth and business model design combine to improve SME performance.

SME owners are encouraged to build heterogeneous and strong network relationships to mobilise social capital to implement different types of innovations. To establish and maintain networks can be costly as it requires time, effort and money. Nevertheless, to ensure that such

investment networks improve firm performance requires selecting new and scrutinising existing ties to maximise their potential to innovate.

Although SME owners are encouraged to implement different types of innovations to enhance performance, they are also advised not to overextend their capacity by innovating too broadly across business functions and activities. The assumption that every innovation is beneficial is misleading and thus flawed. SMEs are advised to limit the number of innovation types they implement within any given year because overextending innovation breadth will be detrimental to performance from one to three years after innovations are implemented. The positive performance benefits of moderate levels of innovation breadth are observed in the short term (one year), with no evidence of lengthy lags. The performance benefits of moderate levels of innovation breadth are also persistent, although decreasing with time, whereas the negative effects of overextended innovation breadth become more pronounced over time.

Moderate levels of innovation breadth should be implemented in concert with designing business models around the value theme of novelty, and to a lesser extent, transaction efficiency as there are potential trade-offs between these model design themes. These value themes describe the overall emphasis or holistic gestalt of the business model. Novelty and transaction efficiency as value creation drivers are the means by which the performance benefits derived from innovation breadth occur. When SMEs innovate the elements of their business models they should do so in a coherent and focussed manner. The results indicate that instead of focussing on improving user simplicity, as so many do, they should rather focus their business model design efforts on building value around instilling novelty or transaction efficiency, but not both.

Lastly, incremental innovations that are only new to the firm are sufficient to ensure positive performance returns. This does not suggest that SMEs should not strive to develop more radical, disruptive and game-changing innovations within the elements of their business models or as business model innovations, but rather points to the fact that lower risk innovations are sufficient for ensuring improved performance and business sustainability.

## **6.5 Limitations**

The limitations of each study in this thesis were presented individually, therefore a brief summary of these limitations are presented here. First, the use of the BLD as a secondary database in Studies Two and Three presented issues that are normally encountered when using large scale Community Innovation Surveys. For example, most of the measures used in these two studies were captured as primarily categorical or binary data, representing a count of their presence, and therefore did not

fully reflect the depth of the phenomena investigated. Second, the cross-sectional design of Study Four prevents examining relations between the variables over time. It also does not allow observation of any changes in the business model designs and their relative impacts on performance. Third, the data in Study Four come from tradable industries in one urban area, Brisbane, within Australia, thus making generalisation of the results to rural and other industry firms difficult. Similarly the results of Studies Two and Three were based on representative SME data spanning the whole of Australia which again makes generalisation of the results to other countries difficult especially if their economic systems and developmental levels differ. Fourth, the impact of exogenous economic cycles when using historical comparisons to test firm performance, as was done in Studies Two and Three, causes problems. The panel data used in Study Three covered the periods 2004-05, 2005-06 and 2006-07, which were characterised by relative stable macroeconomic conditions. However, the data in Study Two was recent, covering data from 2005 to 2010, which meant that the dramatic economic downturn of the GFC late in 2008 and extending well into 2010 was also covered. Statistical analysis did not control for general economic market fluctuations and the results reported for 2009 and 2010 should therefore consider the impact of the GFC upon SME performance in Australia. Lastly, innovation breadth was measured using a composite index of innovation types, capturing the breadth of innovation but not depth. Innovation breadth includes all types of innovation that are new to the focal firm and does not account for different degrees of novelty. These limitations present opportunities for further research as discussed next.

## **6.6 Avenues for Future Research**

A number of further research avenues arise from this thesis' findings. First, the inverted U-shape relationship found in the quadratic regression for SME performance with innovation breadth in Study One, could be tested in a sample of large firms employing more than 200 employees. Such research would use RBT and evolutionary economics to test the hypothesis that larger size would mitigate the adverse effect of extended innovation breadth. Additional innovation measures that captures the degree of novelty and depth or scale of implemented innovations could be used in addition to the innovation breadth measure to not only clarify the relationships between these constructs but also to determine their statistical relationship with SME performance.

Second, regarding Study Three, innovation breadth has been found to mediate the relationship between networking and SME performance. Because of the multifarious nature of the innovation process underlying innovation implementation, innovation breadth may also act as mediator and

hence an intermediate performance outcome for other business processes, activities and orientations such as open innovation practices and learning orientation (Mavondo et al., 2005). Similarly the BLD could be further used to investigate if any additional intermediate outcomes mediate the network – performance relationship. Innovation breadth may represent but one of a number of mechanisms that unlock the performance benefits of social capital embedded in network relationships. Further to this, the strength and diversity of network ties were captured by the network dependent variable in Study Three. Because social capital was assumed to be embedded in network ties, but not directly tested, further research that specifically measures social capital may prove valuable. The assertion that SMEs rely on networks to stimulate their innovation breadth because of limited research and development capacity should also be tested by replicating the study on large firms.

Third, regarding Study Four, the performance impact of design themes was investigated but the study did not test business model innovation. Business model innovation needs to be clarified because it suffers from inconsistent application that hamper the development of empirical measures (Aspara et al., 2010; George & Bock, 2011; Giesen et al., 2009; Johnson et al., 2008; Lambert & Davidson, 2013). Further research should therefore delineate the difference between innovation within the business model, business model design themes and business model innovation. The conceptual parameters between strategy and business model innovation is also unclear as some researchers see business model innovation as a “systematic strategic orientation” (Aspara et al., 2010, p. 42) whereas others see strategy as a plan of action to transform the business model (Casadesus-Masanell & Ricart, 2010). While strategic change may require business model innovation, it seems not to be a prerequisite for such innovation in that firms can achieve this without changing their strategy (Sorescu, Frambach, Singh, Rangaswamy & Bridges, 2011). Clarifying these conceptual boundaries would enable a proxy that extends to both the firm and industry level of analysis to be developed. This would make possible empirical testing of business model innovation, which remains almost non-existent (Aspara et al., 2010; Giesen et al., 2009; Zott & Amit, 2007).

Another related matter that needs to be clarified is the degree of novelty that should be associated with business model innovation. Study Four showed that incremental innovation within the business model is sufficient for performance improvement at the firm level, but this may not be the case for business model innovation as scholars are divided. At one end of the spectrum, Schumpeter (1934) first described business model innovation as the creation of new markets and new industry organisation (Crossan & Apaydin, 2010; Santos, Spector & Van Der Heyden, 2009), thereby emphasising the degree of novelty to extend to the market and industry level. Similarly,

practitioners and some scholars currently view business innovation to be associated with disruptive, discontinuous and radical rather than incremental innovation and thus “a fundamental rethink of the firm’s value proposition in the context of new opportunities” (Bock et al., 2012, p. 290; Crossan & Apaydin, 2010; Mitchell & Coles, 2003; Santos et al., 2009). Johnson et al. (2008, p. 57) agree that business model innovation that is not “game-changing to the industry or market ... would be a waste of time and money”. At the other end of the spectrum, Amit and Zott (2012) argue that business model innovation is applicable to both entirely new business models, which may or may not be disruptive, and incremental changes to the business model that are new to their organisation only. This gap in our understanding of the nature of business model innovation provides researchers with an opportunity to contribute usefully this developing field.

Lastly, empirical validation of the integrated thesis model (Figure 6.4) provides another opportunity for further research. Each of the studies was independently conducted on different samples, albeit from the same larger sample frame. Validation of the integrated model would require capturing all of the variables in one research design using a suitable database, although such a database would be difficult to find and costly. However, it would provide opportunities not only to test the integrated thesis model but also to investigate business model innovation, as alluded to above.

## **6.7 Thesis Conclusion and Reflection on the PhD Journey**

This PhD journey commenced by asking: What is known about SME performance and what are the gaps in our current understanding? To answer these questions the main theories of the firm and firm performance were investigated to also determine the merits of differentiating between SMEs and large firms and hence justify the SME as a unique study object when looking at the determinants of firm performance. The extant empirical evidence on SME growth and performance was then reviewed firstly to identify how researchers describe growth and performance. Secondly, the main concepts and themes present in this literature were determined and thirdly, the potential avenues for further research were suggested. This culminated in Study One in which electronic text analysis and manual coding revealed innovation and networking as prominent variables in the academic literature on SME growth and performance. Strikingly, however, was the absence of theoretical explanations and contradictions on the mechanisms and processes that linked these two antecedents with SME performance which was also echoed in criticism of RBT. Another gap in the empirical evidence on SME growth and performance involved the business model perspective. Practitioners have applied the business model construct as a vehicle for successful new venture creation and as a

tool for existing ventures to create, sustain and renew their competitive advantage. Although there is very little empirical evidence on its relationship to firm performance, the developing business model view is also increasingly adopted by academics in strategy. Returning to RBT, because it became evident that social capital, innovation and business model design were potential areas for further research, Study One found them to be closely associated with or exhibited characteristics of intangible resources that held most promise for SMEs in developing sustainable competitive advantage.

This thesis then investigated innovation as one of the dominant SME performance antecedents, which also received prominence in both the networking and business model literatures. This made it the preferred first study, following the literature review. After uncovering the nature of the innovation – SME performance relationship it became clear that although empirical evidence on this relationship has accumulated a large volume of rich results, two main problems remained: First, a plethora of innovation typologies and operationalisations that made direct comparison of empirical results problematic were observed. Innovation as defined by the OSLO manual formed the basis for designing the innovation measures used in Community Innovation Survey data (similar to the BLD used here). However, most large-scale empirical studies based on this data did not provide for the fact that the community innovation surveys actually measures innovation breadth, but not depth, and definitely not innovation output *per se*. The innovation breadth measure was therefore developed to contribute to existing theories, especially RBT and evolutionary economics because they relate directly to a firm's ability to implement different types of innovations across a number of business functions and elements of its business model. Second, the pro-innovation bias in existing empirical results did not take account of the limitations in resources as well as the risks involved with changing routines as argued using RBT and evolutionary economics. Although overwhelming support for a positive relationship between innovation and SME performance were evident, seen using RBT and evolutionary economics, it seemed unlikely that the broad implementation of different innovation types, at any given time, would only result in positive performance. Study Two therefore tested the validity of the innovation breadth measure as well as the reciprocity, linearity and temporality of the innovation breadth – performance relationship. Results confirmed both innovation breadth as a valid measure and the finite performance that followed. Valuable perspectives regarding the contextual nature of this relationship and its temporality were also uncovered and reported.

The next step was to determine how innovation breadth, networks and business models combined to uncover the mechanisms and processes involved in unlocking their performance benefits for SMEs. This culminated in the last two empirical studies comprising this thesis. Study

Three investigated the relationships between networks, innovation breadth, and SME performance. While the open innovation and network literatures confirmed the validity of the positive effect of network relationships on innovation output, its direct contribution to SME performance was still controversial when considering the results of network-based social capital research (Maurer et al., 2011). In line with the dynamic capabilities perspective (Teece et al., 1997) it was also argued that network relationships, as an integral part of the innovation process, affected SME performance but only relating to its ability to stimulate innovation breadth as an intermediate performance outcome. This mediatory relationship was confirmed and clearly demonstrated that, while social capital as a resource within networks is not intrinsically valuable, its value depends on its use (Lockett, Thompson & Morgenstern, 2009), in this case, as an enabler of innovation breadth.

The last study investigated the relationships between innovation breadth, business model design, and SME performance. Innovation breadth was positively related to performance only when implemented in a business model, designed around coherent value themes. Innovation breadth, as a proxy for innovations within the business model, therefore only improved performance when the value created by it was appropriated by the business model, designed around either the novelty or transaction efficiency value drivers. This study confirms the RBT claim that value creation and appropriation are the main functions of the business model (Demil & Lecocq, 2010). The study again confirmed that resources are indeed defined by their use as it also showed that the business model view extends RBT by attributing value to resources but only when they are organised in such a way as to create value for customers (Priem & Butler, 2001).

While this thesis aimed to contribute to current knowledge on SME performance, it looked further to the pragmatic potential of assisting SME owners to strategically apply their limited administrative capacity and resources to support business performance and thus increase sustainable wealth for themselves and the economies in which they operate.

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## **APPENDIX A: THEORIES OF THE FIRM**

Appendix A backgrounds the theoretical framing of this thesis as it relates to the firm and firm performance, but specifically to SMEs. This work does not claim to comprehensively represent all theories of the firm and firm performance. It rather summarises the most prominent and relevant theories explaining the existence and boundaries of the firm as well as the diversity of their performance.

### **A.1 Introduction**

This thesis is concerned with performance differences among SMEs that characterises the theory of the firm (Madhok, 2002). A theory explaining performance incorporates, and indeed requires, a theory of the firm in that a logical nexus exists (Conner & Prahalad, 1996). A theory in the social sciences involves “a system of constructs and variables in which the constructs are related to each other by propositions and the variables are related to each other by hypotheses” (Bacharach, 1989, p. 498). Accordingly, the criteria for a good theory are numerous and therefore need delineated boundaries, a common language of constructs and variables, be operationalisable, falsifiable, logically coherent and useful enough to have sufficient explanatory powers (Bacharach, 1989; Foster & Jonker, 2006). More specifically, Foss (1997) argues that a theory of the firm needs to address at least one but preferably all of three key matters, namely, the existence of firms, their boundaries, and different types of internal organisation. Very few theories discussed hereunder meet all of these criteria, but are still accepted by academia in literature (Foster & Jonker, 2006). For the purposes of this review, no stringent test will be used to determine if a theory conforms to the requirements of ‘good’ theory, but would rather opt to overview the theories as adopted by scholars in the journal articles reviewed in Study One of this thesis.

When summarising the theories of the firm and firm performance, a number of difficulties arise. Within the confines of this thesis, it is not possible to detail all seminal theories, nor exactly categorise the most prominent ones. It is also difficult to accurately précis some theories that have developed over more than a century, without running the risk of trivialising their complex arguments. Therefore, in reviewing the theories of the firm, the author became acutely aware of the necessity of limiting information as a prerequisite for scientific rigour. As Simon (1947) has it: “In scientific enquiry, knowing refers to knowing parsimoniously” (in Mahoney, 2005: 21). Therefore, what follows is guided by the following principles: First, it summarise a selection of the most prominent theories of the firm and firm growth to arrive at the literature sample of Study One.



Second, if applicable, it explains how these theories conceptualise the boundaries of the firm, firm growth, and performance as well as what propositions they advance for the existence of SMEs. The review commences with neoclassical economics as the oldest theoretical stream. Most theories of the firm historically originate from, or developed as a consequence of disillusionment with the neoclassical economic theories, making it a logical point of departure for discussion.

## **A.2 Neoclassical Economic Theory**

Scholars are divided on who principally developed the neoclassical economic theory. The body of literature that explains the determination of price and output of industries and firms, from the basis of profit maximisation by the individual firm, is generally accredited, in a chronological order, to Adam Smith, Augustin Cournot, Alfred Marshall, John Bates Clark, Frank Knight, Joan Robinson and Edward Chamberlin (Lipczynski, Wilson & Goddard, 2013).

Adam Smith (1776, p. 35) theorised the “invisible hand”, as the metaphor for the self-regulating nature of the marketplace, driven by self-interest and competition. This would ensure that the correct amount of goods to satisfy both consumers and producers would be produced to maximise the welfare of both. Although Smith acknowledges the importance of organisation of work within firms and the growth of firms in industries where the needs of mass markets are satisfied, he does not deliberate the question of firm size, nor of its nature and role. Augustin Cournot contributed to market equilibrium theory by developing the downward sloping demand curve that illustrates the relationship between price of and demand for a given item. He also mathematically showed that profit is maximised when marginal cost equals marginal revenue and pioneered work on duopoly and oligopoly theories (Cournot & Fisher, 1960). Alfred Marshall (2013, first published in 1890) developed the laws of demand and supply in showing how price and output is determined by market equilibrium. He also developed concepts such as quasi-rents (i.e., “income derived from machines” or earnings of capital), price elasticity of demand and consumer surplus (Marshall, 2013, p. 63). John Bates Clark (1899, p. v) is known for marginal-productivity analysis, showing that the “distribution of the income of society is controlled by a natural law” providing each agent of production the amount of wealth it creates. Wages are set by competition and that it is equal in equilibrium to the marginal productivity of labour. Thus, the market mechanism and its margin distribution rules provide fair (satisfying both efficiency and equity) distribution in that the worker is remunerated at a rate equal to his contribution to the productive process. Frank Knight (1965, p. 20, first published in 1921) highlighted the difference between risk and uncertainty in that “... ‘true’ uncertainty, and not risk, ... forms the basis of a valid theory of

profit ...” and accounts for actual competition. He argued that economic profits resulted from uncertainty, which is not governed by probability distributions, and which could not be eliminated by perfect competition. Further, nearly all suppliers of goods and services “enjoy some degree of monopoly ... within a certain market area, and competition is effective only at the boundary between market areas” (Knight, 1965, p. xxii). Edward Chamberlin (1962) and Joan Robinson (1969) published seminal works in the same year (1933) that questioned the relevance of supply and demand analysis in explaining the dynamics of imperfect markets. They build on previous neoclassical economists by exploring the middle ground between the polar extremes of perfect competition and monopoly. They showed that prices do not reach equilibrium in imperfect markets and that producers in such markets set their prices at levels higher than the equilibrium price. In this regard, Chamberlin (1962) developed the concept of product differentiation as part of his theory on monopolistic competition in explaining higher mark-up prices in imperfect markets.

### ***The role of the firm***

Although generalising the neoclassical economists is challenging, they argued that managers act rationally in attempting to maximise profit and firm value given external market constraints and internal factor availability. Equilibrium is pivotal in neoclassical economics as evident in the prominence of the price mechanism where the economy is argued to always move to a state of equilibrium. Optimization is the key ingredient for ensuring growth, which suggests that it is possible for the rational manager to make an optimum decision from a set of all objectively possible choices. Neoclassical economics see competition in industry statically as being perfect, monopolistic, oligopolistic or a monopoly (Lipczynski et al., 2013). Neoclassical economics favours the primacy of the market in determining how the price mechanism coordinates resource distribution, with the nature and role of the firm in the economic system largely obscured (McNulty, 1984). With some exceptions (e.g. Chamberlain & Robinson) the firm generally is seen to have meagre impact on price determination. Neoclassical economists therefore did not advance a theory of the firm in the strictest sense of the term. At this point in economic theory development, no clear definition of the firm had been provided and its role in the market and the realm of exchange were largely disregarded. Where firms were acknowledged, the theory centred mainly on large corporations (mostly within the US economy) leaving small firms ignored. However, Knight (1965) did recognise the impact that diminishing returns to management have on the limitations to firm size because the relationship between a firm’s size and efficiency remains a serious theoretical problem. Counterbalancing decreased efficiency with the incentive for unlimited expansion in the face of monopoly gain needs to be clarified (Knight, 1965). As discussed next, dissatisfaction with

the “divorce of the theory from its subject matter” (Coase, 1988: 3) gradually broadened the discourse in economics from being market-centric to include the business firm so as to open up and delineate the scope of the proverbial “black box” (Casson, 2005; Jensen & Meckling, 1976, p. 306). Questions that remained unanswered by neoclassical theory are: What are the nature and role of the firm? Why does it exist? Why do some firms achieve profits while others struggle to survive; hence, what explain the diverse and heterogeneous nature of firms? The following discussion highlights contributions to different theories that address these questions.

### **A.3 The Behavioural Theory of the Firm**

The behavioural theory of the firm represented an important and pivotal moment in the development of organisational economics. It laid the foundation for other such economic theories; including transaction cost economics, dynamic capabilities theory and evolutionary economics. Chester Barnard (1938) was one of the first to shift the theoretical focus from the market to the industrial organisation. He advocated a multi-disciplinary approach that combined social anthropology, psychology, and sociology with economics. He took a systems view of the organisation to include elements of motivation, behaviour, cooperation, informal organisation, and authority to explain the pivotal role that executives play inculcating common purpose and achieving firm success. According to Barnard an organisation functions to promote communication between individuals, to maintain cohesion through motivation, stability of authority, and maintaining personal integrity and independent choice (Mahoney, 2005).

Herbert Simon (1947; 1982) was influenced by and built on the work of Barnard by combining economics and psychology to illuminate managerial decision-making. He disagreed with the neoclassical economists’ treatment of optimising rational decision-making by the “economic man” and described complex decisions made by “organisation man” to take place in conditions of ‘intended’ and “bounded rationality” or “deliberate and habitual rationality” (Simon, 1947, p. 45, 89). Accordingly, managers take actions in an attempt to achieve reasonable rather than optimum payoffs, which is referred to as ‘satisficing’ decisions made within the bounds of known utility trade-offs and the need to accommodate coalitions of decision makers (Cyert & March, 1963). Although managers intend to be rational, such rationality is limited in practice. Simon’s work influenced the way modern scholars perceive the firm by similar to Barnard, regarding the firm as an organisation, defined as a complex system of human communications and relationships (Mahoney, 2005).

### *The boundaries of the firm, firm size and growth*

The behaviourists recognise managerial cognitive and political processes in organisational decision making (Cyert & March, 1963). Entrepreneurs and managers are not merely passive economic agents, but rather active participants in determining and attaining the firms' growth and performance aspirations. Although not explicit regarding the boundaries of the firm, the behaviourists see organisational size and growth as incentives or "conservation" motives for entrepreneurs, professional managers and employees (Simon, 1947, p. 147). The growth of the organisation is important for the entrepreneur because of the actual or perceived close link between growth and profit (Simon, 1947). Management views organisational growth as a form of performance (Greve, 2008), which also provides greater opportunities for advancement and prestige, feeding the values espoused by professional managers as well as employees for whom employment mobility is important (Simon, 1947). Growth is therefore an inducement for the continued effort and contribution of entrepreneurs, management and employees to maintain the organisation. The organisation is said to be in "equilibrium" when maintaining the life of the organisation attains the personal values of the dominant control group (managers and entrepreneurs) (Simon, 1947, p. 140).

Stated from an open system model, organisational equilibrium is attained when the organisation successfully arrange compensation of all stakeholders, both internal and external, to motivate continued participation (March & Simon, 1958). Below-aspiration-level performance invokes 'problemistic' search and acceptance of risk on the part of management (Cyert & March, 1963) resulting in adapting or changing the firm's strategic direction by, among others, introducing or developing new technologies and targeting new markets or industry segments (Steen & Liesch, 2007). Diversity in firm size within the economy could therefore be argued by a behaviourist to be a manifestation of the diversity in the dominant control group's personal values, experience (Simon, 1947, p. 140), and social comparison (Greve, 2008). An organisation-size aspiration level is directly linked to management's perception "that size affects organisational efficiency or legitimacy" (Greve, 2008, p. 478). Growth is therefore directly associated with the aspiration level for firm size. Organisations that are below the aspiration level for firm size will grow more vigorously especially when their performance goals are satisfied (Greve, 2008).

Agency theory, as discussed next, represents another major development in economics which similar to the behaviourist and the transaction cost economists, placed the role of the manager and owners of the firm centre stage.

#### **A.4 Agency Theory**

The 19<sup>th</sup> and early 20<sup>th</sup> centuries saw increasing complexity in the organisation of large successful firms, which made control by an individual entrepreneur or owner virtually impossible. This led to increased prominence of the professional manager who represents the increasing number of shareholders or principals required to finance the growth of large corporations. The proliferation of public and dilution of private ownership complicated the control of organisations (Berle & Means, 1932). The principal-agent theory addresses the problems associated with the asymmetric information present in designing contractual relationships between principals and agents. It argues that managers (agents) would not act in the best interest of the firm's owners (principals) and thus requires that contracts are necessary to counteract potential conflict. In other words, agents pursue objectives other than profit maximisation in aspiring to further their own interests including non-pecuniary benefits to the detriment of the principals (Jensen & Meckling, 1976). Minimising agency costs requires monitoring and controlling the activities of management to align their interests more closely to that of equity suppliers in corporations. Both behavioural-orientated and outcome-orientated contractual relations are proposed to govern the principal-agent relationship (Eisenhardt, 1989). Agency theory focuses on the private corporation as a form of "legal fiction which serves as a nexus for contracting relationships" (Jensen & Meckling, 1976, p. 311). The firm therefore does not pursue its own distinct objectives, but rather acts like a clearinghouse for sometimes conflicting objectives of all parties linked by the nexus of contracts (Lipczynski et al., 2013).

#### ***SMEs and impact of agency costs on firm growth***

As to firm growth and performance, agency theory argues that managers of large corporations would most likely strive for growth instead of profit maximisation (Marris, 1964). Opposing arguments for the relevance of agency theory in the study of SME growth and performance can be made. First, when viewed as a function of proportional ownership whereby the 20 per cent threshold is applied (see Berle & Means, 1932), agency costs would on average be less universal among SMEs. By implication, smaller firms experience lower agency cost because of larger overlap of ownership and control (Fama & Jensen, 1983), making agency theory more applicable to larger corporations or companies with diverse shareholding. Second, the diverse nature of SME ownership structures and the contractual relationships between principals and agents render it almost impossible to generalise that the division of ownership and control are less pronounced for all SMEs (Harris & Ogbonna, 2007). Agency theory is especially relevant to small firms with dominant start-up teams or entrepreneurs, where agency problems in the form of moral hazard (opportunistic behaviour) and information asymmetry may be more likely to occur when external

capital is required (Chittenden, Hall & Hutchinson, 1996). In these situations such agency problems would require more detailed and complicated contractual arrangements between the owner-managers of small firms and the providers of capital. The higher cost associated with these contractual relationships would impede the small firm's access to equity and long-term debt capital. Lack of external capital may in turn adversely affect the growth prospects of these SMEs, making them more reliant on internally generated funding or scarcer collateralised debt finance. Agency theory therefore explains the dominant capital structures adopted by SMEs and, by implication, their growth and performance prospects.

Transaction cost economics is closely related to agency theory but goes further than the "nexus of contractual relationships" (Jensen & Meckling, 1976, p. 311) to define the reason for the existence as well as the boundaries of the firm as an industrial organisation as discussed next.

### **A.5 Transaction Cost Theory**

Together with the efforts of the behaviourists, Coase (1937), saw the business firm as an institution which despite being central to the economy and thus crucial to economic theory, was nonetheless long-overlooked by the neoclassical economists. Coase asked why firms exist which in answering, he has contributed to the development of a new branch in industrial economics known as transaction cost economics.

Transaction cost economics concerns itself with asymmetric information in transactions caused by bounded rationality, asset specificity and opportunism (Williamson, 1985). Because of bounded rationality, contracts cannot specify and provide for all potential eventualities and consequently are deemed to be incomplete. Transaction cost theory also emphasise asset specificity in that facilities and human resources in organisations tend to be specialised on production and distribution of specific types of products and services. These assets lose their value if "redeployed to alternative uses and users" (Williamson, 2010, p. 220). The presence of asset specificity creates quasi-rents or salvage value, that is, the difference in value between existing application and the next best alternative use of an asset (Lipczynski et al., 2013). In *ex post* contracts, parties can act opportunistically in renegotiating incomplete contracts to appropriate these quasi rents.

Accordingly, microeconomic activity aims to economise production and transaction costs, the latter being all the costs involved in carrying out a market transaction for, searching, information gathering, bargaining, decision-making, policing, and enforcing (Coase, 1988). Thus, 'transaction' is the unit of analysis viewed through the lens of 'contract' (Williamson, 2010). In essence, firms exist because they organise market transactions at lower cost within the firm than

would be possible if organising it in another firm or through the price mechanism within the market. Firms or hierarchies and markets are therefore seen as substitutes or governance alternatives in coordinating economic activity where the firm coordinate through authority relations and the market coordinate through the price mechanism (Garrouste & Saussier, 2005). The task of the entrepreneur is to direct factors of production in such a way as to limit their costs, so that customers will not revert to the open market.

### ***The boundaries of the firm, firm size and growth as well as the existence of SMEs***

Transaction cost economics is explicit about the size and growth diversity of firms. This is reflected in the statement by Williamson (2010, p. 219) that routines describe what is going on most of the time in organisations, but what is interesting behaviour “has reference not to routines but to exceptions”. Firms grow as entrepreneurs organise more transactions that were previously coordinated by the price mechanism and becomes smaller as firms abandon the organisation of such transactions. The unit of analysis is transaction costs which determine the boundaries of the organisation to the extent that “The limit to the size of the firm is set where its costs of organizing a transaction become equal to the cost of carrying it out through the market” (Coase, 1988, p. 7). This author (1988, p. 40) adds that “Apart from the services of factors of production and retail trade” the market in this context is representative of other firms where “most market transactions will be interfirm exchanges”.

Coase is arguing here that, without transaction costs, there would be no firms in the economic system. If the firm governs to minimise transaction costs, it would imply that one large firm would be able to do what a large collection of smaller firms can do and more (Williamson, 2010). Accordingly, transaction cost economics argues that “replication and selective intervention” supports “the all-purpose superiority of larger firms” (Williamson, 2010, p. 221). When two entities are combined, for example through a merger, replication would ensure that the new entity would never do worse, and selective interventions to gain from adaptive coordination would ensure that the new entity would sometimes do better. It follows that larger integrated firms will therefore always be better. This assumption is clearly not reflected in reality, where SMEs dominate the business landscape by virtue of their numbers. Williamson (2010) indicates small firms exist because the conditions required for both replication and selective intervention are actually compromised so that hierarchies exist within markets. However, the sticking point is that firm size is fundamentally limited because of the problem of “governance cost disabilities of internal organisation” (Williamson, 1985, p. 131). As the firm become larger they incur governance costs that include loss of control, politicisation, bureaucracy, internal procurement bias, impairment of

economic incentives, and diminishing returns to management (Mahoney, 2005). Coase (1988, p. 43) agrees with Williamson in stating: “as a firm gets larger, there may be decreasing returns to the entrepreneur function” as well as rising supply prices of factors. Most notable of these is the entrepreneurial factor (i.e., organising ability). Coupled with the rise in price is entrepreneurs’ preference for being independent owners of smaller firms rather than managers in large organisations. Demsetz (1988) distinguishes between transaction and management cost and argues that Coase is wrong in asserting that the absence of transaction costs does not nullify the extent of scale economies to management.

Because of the diverse nature of small firms it is very difficult to generalise the application of transaction cost theory. However, in applying this theory, smaller firms are disadvantaged compared to their larger counterparts in that they incur and cause higher transaction costs (Noteboom, 1993). Such higher transaction costs result from smaller firms’ rationality that is more bounded, is more sensitive to uncertainty, is more vulnerable to opportunism and requires highly transaction specific assets (Noteboom, 1993). Small firms engage in network activities and use their behavioural strengths, such as entrepreneurial drive and flexibility to counter their resource disadvantage and higher transaction cost. Networking to compensate for lack of scale, scope, experience and learning is, however, a two-edged sword in that it comes at a cost, in that it is costly to build and maintain (Noteboom, 1993).

The works of Coase sparked a new theoretical development with a flurry of property rights research by among others, Demsetz (1967), Alchain and Demsetz (1973) as well as Libecap (1989), as discussed next.

## **A.6 Property Rights Theory**

Barzel (1989) sees transaction cost as the costs associated with the transfer, capture, and protection of rights. Property rights theory also assists us to understand the mechanisms and institutions (firms being one type) within the economic system. It explains how the nature in which property rights are defined and enforced impacts upon the performance of an economy that assumes transaction costs and property rights are imperfectly delineated. Three types of property rights are identified: the right to use and transform, the right to earn income from the resource, and the right to transfer ownership, alienate or sell the resource (Mahoney, 2005). Property rights theory essentially looks at exchange by investigating the following: how property rights are formed, the different forms of organisation and the results of distributional conflicts and resultant regulations (Mahoney, 2005). Property rights are formed and enforced by political entities and provide the basic economic



incentive system that directs and shapes resource allocation (Libecap, 1989) and economic performance (North, 1990). Contractual incompleteness and control are seen as essential in understanding economic institutions and arrangements (Hart, 1995). Firms and institutional arrangements are designed to allocate *ex post* control rights resulting from incomplete contracts so that the boundaries of firms will be determined by the optimal allocation of control rights among the parties to a transaction (Hart, 1995).

## **A.7 The Industrial Organisation View**

The industrial organisation view, also referred to as industrial economics, is essentially behaviouristic, being concerned with the environmental settings within which firms as suppliers and buyers of goods and services operate and how they behave in these settings (Bain, 1968). Industrial organisation comprises three main topics: (1) “determinants of the behaviour, scale, scope, and organisation of business firms”; (2) competitive and monopolistic tendencies or “imperfect competition”; and (3) the market structure-conduct-performance (SCP) relationship and the “public policy towards business” (Schmalensee, 1988: 643-644). Initially, industrial organisation did not focus on the internal dimensions of business organisation. While that was regarded more as a topic for management sciences (Bain, 1968), this gradually changed as more emphasis was placed on the firm and competitive strategy (Porter, 1985).

However, the unit of analysis in the industrial organisation view predominantly remains the industry or groups of competing firms and, to a lesser extent, the individual organisation. Industrial organisation is therefore not a distinct theory of the firm but rather a collection of industrial economic theories. It builds on neoclassical economics and includes a large volume of works by, among others, Chamberlin (monopolistic competition), Bain and Mason (part of the Harvard school), Cyert, March and Simon (behavioural theory), Stigler (oligopoly structures; part of the Chicago school with Demsetz, Kitch and later Coase), von Mises and von Hayek (part of the new Austrian school) and Porter (new industrial organisation).

The industrial organisation view initially centred on ‘structure–conduct–performance’ (SCP), introduced by the “Bain-Mason-Scherer” partnership (Foss, 1999), as presented by the Harvard School and later adopted by the bulk of economic scholars. It was based on the concept that high firm concentration (small number of market participants) induces less competition and therefore higher prices, requiring regulatory intervention. In essence, the SCP theory states that industry structure determines the conduct of firms which, in turn, determines the collective performance of the firms in the industry (Porter, 1981). Market structure refers to the organisational characteristics

of the market reflected in the number and size distribution of buyers and sellers or degree of market concentration, product differentiation, vertical integration and diversification, as well as entry and exit conditions or barriers to the market. Market conduct relates to the patterns of behaviour adopted by buyers and sellers. The dimensions of market conduct encompass business objectives, price policies, and the mechanism of interaction, ranging between express collusion to predatory competition (Bain, 1968). Conduct is also manifested in research and development (R&D) or innovation activities, mergers, as well as non-price competition or endogenous differentiation in product design, branding, advertising and marketing (Lipczynski et al., 2013). Market performance is reflected by indicators that include, among others: output, efficiency, profit margin, product quality and technological progress.

The Harvard School and its new industrial organisation views bridged the divide between industrial organisation and business policy scholars and addressed, among other topics, the dissatisfaction with the implicit determinism in the SCP framework (Porter, 1981). The original SCP framework argues that firm conduct, and therefore, by implication, firm strategy, could be largely ignored in explaining performance because it is ultimately determined by industry structure. This hypothesis has been largely rejected by the new industrial organisation view as bidirectional effects has been established in empirical studies, finding feedback loops between performance and conduct, in that past performance impact conduct. Feedback loops also exist between conduct and structure in that firm strategy may initiate changes in market structure (Porter, 1981). These findings, which emphasise the importance of firm conduct, brought the new industrial organisation view closer to the strategic management domain by shifting the unit of analysis from an exclusive industry focus to also include the individual firm and hence both inter-firm and inter-industry differences. The new industrial organisation view also moved away from a static to a dynamic model of industry evolution. According to Porter's (1980, 1985, 2008) five competitive forces approach, firms can achieve abnormal profits if they manage to occupy defensible positions against competitive forces within an attractive industry. Porter (1985) assumes that the choice of 'generic competitive strategies' within a given market strongly influence firm performance by creating cost and/or differentiation advantages. The new industrial organisation view also incorporated elements of the Game Theory (Nash, 1950; Tirole, 1988) in describing strategic decision making and competitive behaviour within a dynamic framework, revealing how firms influence the behaviour of rival firms with their strategic moves and thus the market environment (Shapiro, 1989).

***Industrial organisation's treatment of small firms in the economy (according to Bain and the new industrial organisation view)***

The industrial organisation view regards the large corporation as the dominant form of business organisation within the US economy because of the high degree of business concentration present. The proportion of business entities controlling the total business assets within an industry or economy is large (Bain, 1968). However, similar to economies worldwide, the bulk of firms within the US economy are 'unincorporated' enterprises that control a small part of the aggregate assets and are therefore largely disregarded in the industrial organisation empirical analyses conducted. Bain (1968, p. 123) contends that small firms on the "competitive fringe" of the industry have a competitive disadvantage compared to large firms in that they have lower production volume and market share, higher production cost because of inefficient scale, as well as perceived inferior buyer evaluation of their products. This necessitates small firms to compete primarily on price. Their presence in economies dominated by oligopolistic industries is thus generally regarded as having only "slight actual or potential influence on industry conduct and performance" (Bain, 1968, p. 139). Product differentiation or the "imperfection in the substitutability" for buyers of market offerings based on quality, design, seller reputation, brand loyalty, prestige, customer service, or even "locational product differentiation" results in "small individual market shares", which in turn explain the existence of the varying degrees of competitive fringes of smaller firms found in oligopolistic markets (Bain, 1968, p. 224, 228, 231). Structural changes, where industries transform from atomistic (many sellers competing) to oligopolistic industries, normally lead to small firms being displaced by larger firms as was evident in the US distributive trades with the integration of wholesale and retail into mass chain store distribution (Bain, 1968). Small firms' positions in these industries are destroyed. Larger more efficient firms reduce or eliminate their profits leading to perceived social costs in high small-firm mortality rates. This in turn leads to the higher potential for regulatory policies aimed at preserving competition and prevention of monopolistic competition to be introduced.

The traditional view in industrial organisation is therefore that the market size divided by the minimum efficient scale (Bain, 1968), that the smallest output at which cost is minimised, would determine the number of efficient size firms that would fit in an industry to indicate the industry concentration (Kwoka & White, 2001). However, this is not realistic as some industries, including those concerned with "brewing, autos, computers and coffee" exhibit higher market concentration than would be suggested by the traditional industrial organisation measure using scale economies and market size (Kwoka & White, 2001, p. 28). The phenomenon where larger firms tend to become larger and smaller firms less numerous results from the level of price competition, the

extent of differentiation, and the endogenous sunk costs, which themselves result from leading firms' decisions about investments and advertising and R&D expenditure (Sutton, 1991). Leading firms therefore can maintain or increase the level of market concentration by forcing "smaller businesses to choose between the loss of customers and a heightened cost disadvantage" (Kwoka & White, 2001, p. 28). In summary therefore, the new industrial organisation view prescribes closer scrutiny of both the market and the strategic environment in which small firms operate by assessing the performance prospects of small firms.

### **A.8 Chandler's "Capabilities" Theory of Strategy**

Alfred Chandler (1962, 1990) built upon transaction cost and evolutionary economics to emphasise the role of large corporations' executive as pivotal for organisational innovation and improved performance. As such, he notably contributed to the economic theory of strategy and influenced thinking by highlighting organisational competencies.

#### ***The boundaries of the firm, firm size and growth***

According to Chandler (1992, p. 98) "competencies determine the limits of growth" of the firm, being the central unit of analysis. He contributed to the development of strategic management by suggesting that structure follows strategy and that the multi-divisional form of the organisation is valuable to resource allocation and coordination within large corporations (Teece, 2012). Performance to Chandler directly resulted from management's ability to achieve scale and scope (1990) by expanding, leveraging, and rationalising resources (1962). He said that large organisations grow in the short term through vertical integration and achieve long-term sustainable growth through geographic and market expansion. Geographic expansion is made possible by leveraging economies of scale, whereas related product market expansion is made possible by the learned organisational capabilities resultant from economies of scope (Chandler, 1992). He also advocated that competitive advantage is the result of three investment strategies: (1) Production – lowering unit production cost through investing in large-scale manufacturing; (2) Distribution – investment in networks (marketing, distribution and purchasing); (3) Management – recruiting and organising professional managers (Chandler, 1990; 1992). He further emphasised the importance of organisational capabilities in stating that the boundaries of the firm are determined by the "firm's facilities and skills" more so than transaction cost (Chandler, 1992, p. 86). These organisational capabilities are powerful barriers to entry by other organisations and result from "cumulative learning" in oligopolistic competitive markets (Chandler, 1992, p. 83). Continued learning and the

“creation, maintenance and expansion” of organisational capabilities are regarded as the cornerstones of sustained competitiveness and profitability (Chandler, 1992, p. 84).

### ***Small firms in the economy***

Chandler (1990, p. 45) acknowledges that, in labour-intensive industries, such as manufacturing, single-unit small firms may benefit competitively more than larger firms in adapting to change. This is less evident in capital-intensive industries where firms are able to use economies of scale and scope. Small firms that target niches with specialised offerings, overlooked by standardised mass-production first-movers, are able to obtain a secure base for growth in expanding industries. In general however, Chandler theorises that long-term sustainable growth results from organisational capabilities emanating from the three pronged investments made, functional and strategic competition with first movers and challengers, and capturing new markets. Small firms lack the “financial resources, physical facilities, or technical and managerial skills to accomplish” entry into established markets (1990, p. 231). Chandler therefore believed, in line with Schumpeter’s (1950) reasoning, that large firms in capital-intensive industries, but not small firms in labour-intensive industries or niches were the primary drivers behind the “growth of modern industrial capitalism” (1990, p. 605).

### **A.9 Resource-Based Theory (RBT)**

The industrial organisation, agency, and transaction cost theories have built on neoclassical economics to explain that the firm is organised to protect itself against opportunism resulting from information asymmetries. Management and organisational scholars developed RBT to compliment, rather than oppose, existing economic theories (Barney, 2002; Lipczynski et al., 2013; Peteraf & Barney, 2003). RBT has become one of the most influential and cited theories in the history of the management field (Kraaijenbrink, Spender, & Groen, 2010; Barney, Ketchen, & Wright, 2011). As a relatively new paradigm, RBT received increased scholarly attention after Wernerfelt (1984) proposed analysing firms from the resource side. In doing so, he directed attention to the seminal work of Penrose (1959).

Penrose focussed on endogenous firm growth by adopting a perspective to view firm growth as a process wherein firms acquire, build and adapt resources, including physical and knowledge based assets, to realise market opportunities. Foss (1999) argues that Penrose’s contribution to RBT is negligible and that her contributions are more closely related to the behavioural theory of the firm. Closer examination of Penrose’s (1959, p. 16) work confirms, by her own admission, that “the

administrative functioning of a firm set forth [in her work] does not differ fundamentally from the concepts underlying the analysis of ... organisational theorists". Notwithstanding the difficulties associated with grouping theorist into specific paradigms, Penrose's association with the organisational theorists however does not justify Foss' (1999) somewhat radical position. Scholars persistently agrees (Barney, 2001; Kor & Mahoney, 2004) that Penrose's work contributed significantly to the development of RBT.

The central purpose of RBT is to determine performance differences among competing firms that can be attributed to the differences in their resources (Madhok, 2002; Peteraf & Barney, 2003). More succinctly, it is "a factor-based, efficiency-oriented, and firm-level explanation of performance differences" (Peteraf & Barney, 2003, p. 315). Some scholars are of the opinion that RBT does not constitute a theory of the firm, but rather a theory of economic rents and sustainable competitive advantage as opposed to transaction cost economics which is a theory of the existence of the firm, clearly delineating the boundaries of the firm within the market (Foss, 1996; Kraaijenbrink et al., 2010; Mahoney, 2001). Although this argument may be warranted, it has to be noted that RBT implicitly accounts for some differences between the firm and market transactions. Transaction cost economics asked why some activities take place within firms instead of being organised by the market. Similarly, Madhok (2002) argues that when considering that the market represents exchanges between firms, RBT focus on why some economic activities are performed by some firms and not by others. RBT specifically look at intra-industry performance differentials and not inter-industry, although sources of inter-industry differentials may, at times, be found on the resource level as well (Peteraf & Barney, 2003). RBT of the firm contends that firms comprise unique bundles of resources. The level of analysis is therefore at the resource and firm level in that RBT focus on efficiency differences from the superior use of resources and less on performance differences as a consequence of market power or collusive, anti-competitive behaviour at the industry level (Peteraf & Barney, 2003).

### ***Firm performance***

Firm performance can be explained by differences in endowment among firms. These differences relate to tangible and intangible assets, collectively referred to as 'resources'. Resources in its broadest sense imply anything that represents either a strength or weakness for the firm (Wernerfelt, 1984). This may include capital, technology, physical assets, capabilities, skills, human resources, learning and cognition, knowledge, reputation, patents, and more. According to RBT, performance differences among firms originate from managements' ability to obtain, develop and use resources and capabilities to build and sustain competitive advantage within their industry (Wernerfelt, 1984;

Barney, 1991). For a resource to be *strategic* in yielding a sustainable competitive advantage, the resource must be; *valuable* in exploiting opportunities and neutralising threats, *rare*, *imperfectly imitable* and *non-substitutable*, known as the VRIN criteria (Barney, 1991, p. 106; Dierickx & Cool, 1989, p. 1510). Valuable and rare resources can be developed into competitive advantage but these competitive advantages would be temporary as competitors can imitate. To create sustainable competitive advantage it would require the resources and capabilities to be imperfectly mobile therefore inimitable and non-substitutable (Barney, 1991; Dierickx & Cool, 1989). Although intangible and tangible resources are normally bundled together and because intangible resources “tend to be path dependent, socially complex, and causally ambiguous”, it then makes these intangible resources and the business processes that exploits them less imitable and therefore the competitive advantage more sustainable (Ray et al., 2004, p. 26; Barney, 1991).

The connection between resources and capabilities is not always clear as they are used interchangeably (Ray et al., 2004). Grant (1991) clarified this in explaining that complex patterns of coordination between people and other resources are required for creating *capabilities* and that such coordination is made possible through learning by repetition. Mahoney and Pandain (1992) in turn referred to *distinctive competencies* as key to making better use of resources. Similarly, *core competencies* are the collective learning in the organisation in integrating and coordinating multiple skills and technologies which acts as a source of growth and new business development (Prahalad & Hamel, 1990). The mere possession of resources does not automatically lead to sustainable competitive advantage but require business processes that would translate or exploit these resources into becoming a sustainable competitive advantage (Newbert, 2007). Barney (2002) augmented his VRIN criteria to also include ‘organisation’ into the so called VRIO framework, reasoning that a firm should have the organisation in place that can absorb and apply its resources. Kraaijenbrink et al. (2010) criticised RBT for not adequately explaining the types of business processes that would be required to manage and exploit the resources of the firm in creating sustainable competitive advantage in the market. Teece et al. (1997) addressed this gap in RBT by proposing their dynamic capabilities framework as an extension to RBT, discussed hereunder. More recent work also attempts to explain these resource-related business processes undertaken by management, suggesting that ‘resource orchestration’ is the key to effectively structure, bundle, and leverage resources in firms (Simon et al., 2011).

### ***The boundaries of the firm***

RBT sees the boundaries of the firm at an abstract level to be determined by ownership and coordination of resources. Penrose (1995, p. xvi) defined the boundaries of the firm “in terms of the

firm's managerial and administrative activities". "It is the 'area of co-ordination' – the area of 'authoritative communication' – which must define the boundaries of the firm" (Penrose, 1959, p. 20). "Economies of growth exist for all sizes of firms" and may depend on the efficient use of resources from both the firm and the market's point of view (Penrose, 1959, p. 262). Firm growth rate is determined by the growth of knowledge in the firm and the limit to growth is determined by the firm's effectiveness in expanding its administrative responsibilities, therefore the absolute size of the firm does not matter but rather its administrative efficiency. The most important aspects of Penrose's theory on the growth of the firm can be summarised as cognition, learning and co-ordination (Foss, 1999; Steen & Liesch, 2007). Teece et al. (1994) build on Penrosean theory to depict the boundaries of the firm as a function of three components; the regime of learning (the rate at which learning takes place), degree of path dependency (building on what is already known, what it choose to do depend on past choices or knowledge acquired) and the effectiveness of the selection mechanism (how close is search to existing core competencies of the firm).

In summary, RBT therefore contends that resources can be bundled into different capabilities which in turn explain differences in competitive advantage as well as firm growth and performance (Clarysse, Bruneel & Wright, 2011).

### ***The existence and growth of small firms according to RBT***

Penrose focus on the growth of the firm, thus performance differences and did not emphasise firm size differences. She did however, incidentally question how it is possible for small firms to establish and attain growth within an economy dominated by large firms with superior competitive advantage. She calls the productive opportunities in the economy that provide the basis for the existence of small firms "*interstices*" (1959, p. 222). Briefly stated, interstices exist because large firms cannot exploit all new opportunities nor fully block the new entry of small firms. The early stages of industrial development and the creation of new industries pose greatest opportunities for small firms to exploit interstices. This does not imply that existing markets where large firms already dominate the competitive landscape would not present opportunities for small firms. On the contrary, the expansion of large firms within such industries in itself opens up new opportunities for small firms as "technological knowledge grows and becomes increasingly diffused" (Penrose, 1959, p. 224). Large firms require extensive continued investments in research and development to enable them to take advantage of new opportunities and develop new products. Such research and development investments are restricted by investments required for maintaining current competitive position/s which increase as the firm grow. Penrose therefore reasons that over time, the interstices



for smaller firms will broaden as the proportion of new opportunities for investment that large firms can take advantage of dwindle.

Although the presence of interstices or niches within the market present small firms with opportunities the application of RBT to small firms is not universally accepted. Connor (2002) criticised RBT for only applying to large firms, arguing that in the absence of market power small firms have very limited prospects of developing strategic resources. The limited resources of small firms therefore place them at a disadvantage, impeding or negating their ability to develop sustainable competitive advantages in their markets. This argument is highly contestable for two reasons. First, small firms can operate in geographic, product or service niches where they could etch out a dominant position relative to their competitors within the niche they chose to operate in. Second and more importantly, the resources required for the development of competitive advantage comprise bundles of both physical and intangible resources, of which the latter has the greatest strategic potential (Ray et al., 2004; Barney, 1991). Small firms lacking physical resources could still develop competitive advantage by relying heavily on leveraging superior intangible resources. Empirical research confirms this conjecture in supporting RBT when finding that newly established small firms' chances of survival are enhanced by intangible resources (education and experience) as well as tangible assets (start-up financial capital) (Coleman, Cotei & Farhat, 2013). Kraaijenbrink et al. (2010) observe that Connor's (2002) criticism is informative in that it points out another deficiency in the application of RBT: There seems to be an implied assumption that all firms strive toward attaining sustained competitive advantage and that RBT apply only to firms with growth aspirations. This may account for the increased adoption of RBT by the entrepreneurial (Alvarez & Busenitz, 2001) and more recent strategic entrepreneurship (Ireland, Hitt & Sirmon, 2003) literatures where entrepreneurial firms are characterised as espousing a value creation motive in seeking entrepreneurial rents, implying also a search for competitive advantage. Dynamic capabilities, as an emerging research field is closely related to RBT in explaining the processes through which resources translates into performance benefits, will be briefly discussed next.

#### **A.10 Dynamic Capabilities Framework**

The dynamic capabilities framework of firms is an extension of RBT and unmistakably Schumpeterian in focussing on the ability of a firm to build 'new combinations' (Teece & Pisano, 1994). The dynamic capabilities framework is essentially a theory of firm performance within the ambit of strategic management (Teece et al., 1997). It explains how firms gain sustainable competitive advantage through building, adapting, reconfiguring, integrating, coordinating, and

redeploying internal and external skills, resources and competences in response to a rapidly changing environment (Teece & Pisano, 1994). Not only do dynamic capabilities address rapid or moderate changing business environments, they can also act to shape them (Eisenhardt & Martin, 2000; Teece, 2012, p. 9; Teece et al., 1997).

Three clusters of competencies are central to dynamic capabilities: *sensing* opportunities, *seizing* these opportunities by mobilising resources to capture value, as well as transforming or *reconfiguring* the organisation and its markets by shaping and reshaping it (Teece, 2007). Dynamic capabilities theory borrows extensively from learning theory (Levinthal & March, 1993; Zollo & Winter, 2002) as well as evolutionary economics (Nelson & Winter, 1982a) by emphasising the role of path dependencies, where that past investments and routine repertoires constrain future behaviour and by also looking at the role of replication and imitation of firm processes and positions (Teece et al., 1997). Dynamic capabilities are seen as “tools that manipulate resource configurations” and that the evolution thereof is guided by learning mechanisms (Eisenhardt & Martin, 2000, p. 1118). A direct link between dynamic capabilities and firm performance are generally not upheld. Instead this relationship is mediated by its ability to change a firm’s resource configurations and product market position (Zott, 2003). Dynamic capabilities therefore impact performance indirectly via intermediary performance outcomes (Barreto, 2010).

One type of dynamic capability said to enhance a firm’s ability to sustain a competitive advantage is absorptive capacity (Zahra & George, 2002). Absorptive capacity together with other capabilities and closely related perspectives that have been used in studies explaining SME performance will be briefly commented on next.

#### **A.11 Absorptive Capacity, Organisational Learning, the Knowledge-Based View, Human and Social Capital as well as Networks**

Cohen and Levinthal (1990) use the term absorptive capacity to describe the ability of a firm to gather, assimilate, and apply new knowledge. Similarly, Zahra and George (2002, p. 186) define absorptive capacity “as a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability”. Organisations with “higher levels of absorptive capacity will tend to be more proactive, exploiting opportunities present in the environment” (Cohen & Levinthal, 1990, p. 137), to improve their strategic flexibility, innovation output, and performance (Zahra & George, 2002). The capabilities to acquire and assimilate external knowledge relate to organisations’ “potential absorptive

capacity”, whereas transformation and exploitation in using the knowledge that was absorbed refer to “realized absorptive capacity” (Zahra & George, 2002, p. 190).

Organisational learning helps to create absorptive capacity and is a function of prior knowledge and experience. Both knowledge-based and organisational learning theories therefore inform us about absorptive capacity and are closely related to RBT. Penrose (1959) said that firm growth depends on applying entrepreneurial and managerial knowledge, configured as resources and, the managerial processes through which knowledge is acquired and applied (Macpherson & Holt, 2007). The basic premise of knowledge-based theory is that knowledge (both tacit and explicit) (Polanyi, 1966) is created, owned and exercised by individual employees and thus represents the primary resource of the firm (Grant, 1996a). The immobility or ‘stickiness’ of knowledge, because it is intrinsically complex and tacit, is argued to be superior to other firm resources in generating sustained advantage by guarding against competitor imitation (McEvily & Chakravarthy, 2002).

Organisational capabilities and ultimately the success of the firm depend on its ability to harness and integrate the knowledge of individuals (Grant, 1996b), necessitating the implementation of governance structures, systems, procedures, incentives and a culture that would enable learning and the generation of new knowledge (Macpherson & Holt, 2007; Nonaka, Toyama & Nagata, 2000; Zahra & George, 2002). Knowledge is however, costly to produce, maintain and use (Demsetz, 1988) which means it is scarce but potentially valuable. Organisational learning literature dictates that firms have two knowledge strategy options: First, the generation or acquisition of new knowledge. That comprise *exploration*, including “search, variation, risk taking, experimentation, play, flexibility, discovery, innovation”) or the application of existing knowledge (*exploitation*, including “refinement, choice, production, efficiency, selection, implementation, execution”) with potential trade-offs in resource allocation decisions in that exploitation seems to be beneficial in the short term but exploration delivers superior performance in the long term (March, 1991, p. 71). Second, finding and maintaining an appropriate balance between exploration and exploitation can be path-dependent, influenced by existing capabilities, and is essential to firm performance (Cohen & Levinthal, 1990; Levinthal & March, 1993; March 1991).

Human capital is defined as both the industry-specific and firm-specific knowledge and skills possessed by individuals and used by a firm to produce valuable market offerings (Pennings, Lee & Witteloostuijn, 1998). The knowledge vested in individuals is transferred through individual and intra-firm interaction within networks of formal and informal relationships (Grant, 1996b). Such knowledge forms an integral part of social capital in that it represents one of the intangible resources embedded in networks (Nahapiet & Ghoshal, 1998). Networking is said to blur the

“administrative boundaries of the linked firms” (Penrose, 1995, p. xix), enabling them to perform and grow beyond the limits imposed by the scope of “co-ordination by direction” of similar activities build on a specialised capabilities set “within” the firm (Richardson, 1972, p. 890, 896) as well as the limits imposed by transaction cost efficiency (Cause, 1988). Networks enable firms to access “complementary but dissimilar activities” based on different competencies possessed by other firms (Richardson, 1972, p. 892). Similarly, the relational view of the firm (Dyer & Singh, 1998) sees the firm’s critical resources to “span firm boundaries and are embedded in inter-firm resources and routines” (Laursen, Masciarelli & Prencipe, 2012, p. 179). Both human capital and social capital are therefore important to firm survival, especially when they are idiosyncratic to the focal firm (Pennings et al., 1998).

This above discussion illustrated that absorptive capacity, human and social capital, network relationships, and organisational learning and knowledge are interrelated and important for managing the growth of a firm. The application of these resources or capabilities to SMEs is explored next.

### ***Applicability to SME growth and performance***

Small firms are regarded as having less access to physical resources and therefore being heavily reliant on knowledge-based resources, including both exploration and exploitation, which relate positively to SME performance (Wiklund & Shepherd, 2003b). Macpherson and Holt (2007) shine light on the links between knowledge, learning and small-firm growth. They show that SME growth is a function of human capital (both entrepreneurial and managerial capacity), organisational structures that facilitates knowledge transfer and encourage learning, and social capital and networks. The reliance of SMEs on social capital and networks is covered in Study Three of this thesis.

## **A.12 Evolutionary Theory of Economic Exchange**

Nelson and Winter (1982a, p. 39) propose an evolutionary theory that was inspired by Schumpeter to the extent that they refer to their theory as “Neo-Schumpeterian”. In essence, they argue that firms are motivated by profit, but that their actions are not regarded to be profit-maximising within conditions of perfect information as proposed in neoclassical economics. Besides Schumpeter’s works (1934; 1950), evolutionary economics builds on the behavioural theorists, especially by adopting the concept of bounded rationality (Simon, 1947). It also builds on organisation and strategy research by Penrose, Coase, Williamson and Chandler to develop a dynamic theory about

the diversity of firms. According to this theory, firms possess “capabilities and decision rules” that change over time through deliberate action and random events (Nelson & Winter, 1982a, p. 4). The market determines which firms are profitable and which should be pushed out through an economic process, analogous to the natural selection of genotypes with differential reproduction rates in biological theory (see Lamarckian inheritance theory) (Hodgson, 2003).

Nelson and Winter (1982a, p. 410) provide a simplified model of evolutionary theory that brings investment and firm growth together as follows:

*“Profit-seeking firms invest because they can cheaply replicate their distinctive routinized ways of doing things and because the prevailing market signals indicate that it is profitable to do so; investment produces growth in capacity if not in sales revenue, and growth differences among firms are a mechanism of adaptive change in the mix of routines displayed in the industry”.*

Routines are seen as all “regular and predictable” behavioural patterns of firms characterised by formal and informal processes and procedures (Nelson & Winter, 1982a, p. 15). Organisational memory underlies the routines that determine behaviour and are analogous to genes in evolutionary biology. Therefore, firm behaviour is seen as path-dependent, dictated by general habits and strategic orientations, and resulting from the firm’s past and memory. Higher order routines are referred to as ‘searches’ (mutations in biology) and act to modify lower order routines (capabilities and choice). Searches are partly predictable and routinised to represent those activities associated with the evolution of current routines.

## APPENDIX B: FREQUENCY STATISTICS FOR PERFORMANCE AND INNOVATION BREADTH (Study Two)

Proxies	Performance '06			Performance '07			Performance '08			Performance '09			Performance '10		
	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
0	265	13.3	13.3	182	9.8	9.8	141	8.8	8.8	145	9.9	9.9	121	8.7	8.7
1	179	9	22.3	199	10.7	20.5	156	9.7	18.5	195	13.4	23.3	192	13.8	22.6
2	220	11	33.3	200	10.8	31.2	186	11.6	30.1	224	15.4	38.7	206	14.9	37.4
3	168	8.4	41.7	116	6.2	37.5	156	9.7	39.9	143	9.8	48.5	122	8.8	46.2
4	302	15.2	56.9	321	17.3	54.7	283	17.7	57.5	281	19.3	67.7	264	19	65.2
5	201	10.1	67	168	9	63.8	177	11	68.6	136	9.3	77	142	10.2	75.5
6	215	10.8	77.8	233	12.5	76.3	176	11	79.5	126	8.6	85.7	134	9.7	85.1
7	220	11	88.8	238	12.8	89.1	188	11.7	91.3	116	8	93.6	103	7.4	92.6
8	223	11.2	100	203	10.9	100	140	8.7	100	93	6.4	100	103	7.4	100
Total	1993	100		1860	100		1603	100		1459	100		1387	100	
Missing	304			437			694			838			910		

Proxies	Innovation Breadth '06			Innovation Breadth '07			Innovation Breadth '08			Innovation Breadth '09			Innovation Breadth '10		
	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
0	1125	55.8	55.8	1186	63.2	63.2	1018	59.2	59.2	1048	65.1	65.1	938	61.8	61.8
1	293	14.5	70.3	244	13	76.2	306	17.8	76.9	188	11.7	76.8	223	14.7	76.5
2	235	11.7	82	181	9.6	85.8	160	9.3	86.2	130	8.1	84.8	136	9	85.4
3	139	6.9	88.8	105	5.6	91.4	106	6.2	92.4	83	5.2	90	79	5.2	90.6
4	99	4.9	93.8	73	3.9	95.3	67	3.9	96.3	57	3.5	93.5	46	3	93.7
5	53	2.6	96.4	47	2.5	97.8	29	1.7	98	42	2.6	96.1	35	2.3	96
6	39	1.9	98.3	18	1	98.8	12	0.7	98.7	23	1.4	97.6	21	1.4	97.4
7	18	0.9	99.2	17	0.9	99.7	15	0.9	99.5	18	1.1	98.7	17	1.1	98.5
8	11	0.5	99.8	5	0.3	99.9	3	0.2	99.7	10	0.6	99.3	6	0.4	98.9
9	3	0.1	99.9	1	0.1	100	3	0.2	99.9	5	0.3	99.6	7	0.5	99.3
10	2	0.1	100				1	0.1	99.9	3	0.2	99.8	5	0.3	99.7
11							1	0.1	100	3	0.2	100	3	0.2	99.9
12													1	0.1	99.9
13													1	0.1	100
Total	2017	100		1877	100		1721	100		1610	100		1518	100	
Missing	280			420			576			687			779		