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Dynamic capabilities and New Zealand engineering firm growth.

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BUSINESS SCHOOL

Abstract

The dynamic capabilities framework is suggested as a means to explain how a firm can achieve sustained growth through endogenous means (Helfat et al, 2007; Teece, Pisano, & Shuen, 1997; Teece, 2009; Zollo & Winter, 2002). Dynamic capabilities are underpinned by internal firm processes that enable a firm to sense and seize internal and external opportunities, and transform their resources to ensure a sustained competitive advantage.

Dynamic capabilities though, have a shortcoming in that they are difficult to understand, hard to identify, and are vague (Eisenhardt & Martin, 2000; Kraatz & Zajac, 2001; Kuuluvainen, 2012; Winter, 2003). Despite some recent studies on how dynamic capabilities influence superior firm performance these are limited in scope and of limited applicability to a New Zealand context.

The research on how dynamic capabilities influence firm growth was conducted on engineering firms operating in the NZD18 billion New Zealand energy industry. The context was chosen as many of these firms are New Zealand small to medium enterprises (SMEs), of 250 full time employees or less (OECD, 2004) and subject to market demand factors largely outside of their control. As SMEs contribute significantly to job and economic growth (Dobbs & Hamilton, 2007; MED {MBIE}, 2011b) this outcome is expected to contribute to New Zealand's employment and financial sustainability.

In response to calls to examine which dynamic capabilities (if any) influence sustained firm growth this thesis developed a qualitative research methodology, with the use of visual aids, with which to operationalise dynamic capabilities and examine their influence on firm growth.

The research finds that sensing and seizing capabilities contribute to sustained growth when the market offers growth opportunities and the firm is declining in profitability. Transformational capabilities contribute to sustained growth when the firm experiences declining market opportunities and firm profitability. Surprisingly, when the market offers growth opportunities and the firm is in a profitable situation, firms that used this situation to transform their resources, were able to sustain their growth.

Dedication

I dedicate this thesis to Jo, Julianne and Georgina.

Acknowledgements

Becoming a business owner before my 40th birthday was a dream come true. Fresh out of the University of Auckland Business School armed with an MBA I invested in two established small firms. The opportunities to grow from 2007 were many and by 2008 my business partners and I had established an Australian joint venture, doubled our turnover, grown market share and bought a warehouse. By 2010, the Global Financial Crisis had impacted New Zealand and hit our firm hard. Turnover dropped, margins fell and throughput in the factory diminished. With the expansion in the firm funded with debt, it became apparent that our path of growth was not sustainable.

It was then that Glenn Simmons handed me two books; *Dynamic capabilities and strategic management* and *Theory of the growth of the firm*. After reading them my interest in learning more about how firms grow through internal opportunities was piqued. I was introduced to Hugh Whittaker. My academic journey had begun.

Along the way I met many inspiring people, the late Alan Rugman, Timothy Sturgeon, David Teece, Martie-Louise Verreyne, Ken Platts and Per Davidsson to name a few. They all contributed to my greater understanding of the world of business academia. In addition, the regular interaction with the teams at University of Auckland Business and Engineering Schools has provided me with constant feedback and sound advice. There are many who should be thanked and I could not attempt to include everyone. In no particular order I thank Glenn, Ben, Antje, Hugh, Daniel, Susan, Judy, Basil, Natasha, Chris, Frank, Peter, Kenneth and Snejina for their advice, sometimes harsh, sometimes detailed but always constructive. I must also make mention of my engineering mentor, Rainer Seidel, now retired. There is also a list of contacts I have had at the engineering school, Mehdi in particular, who have listened and offered their thoughts in forums I was invited to participate in.

I would like to acknowledge Nigel Haworth, my supervisor who helped me through some tough academic challenges. I would like to thank you for your sound advice and practical suggestions. You have truly made my academic journey an enjoyable challenge. I do hope we get that round of golf in!

As a middle aged “student” I had many considerations and responsibilities whilst I cut this academic cloth. My dear family have joined me on this journey and I thank Juju and Gina for putting up with a father who has relentlessly pursued his personal goals at the cost of not always being present. I would like to especially thank my beloved wife, Jo, for keeping the faith on this extraordinary journey.

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Chapter 1: Introduction.

Recent analysis of New Zealand firm growth (Growing New Zealand Business {GNZB}, 2011) has highlighted that a large proportion (77%) of small to medium enterprises (SMEs) aspire to grow. SMEs are expected to deliver higher financial returns, employment and innovation to the New Zealand economy (Dobbs & Hamilton, 2007). Yet SMEs have not delivered on these expectations in recent times (MBIE, 2014; MED {MBIE}, 2011b). An understanding of how SMEs grow, despite external and internal limitations, would offer this sector of the economy an opportunity to realise this expectation.

Firms often grow from the external opportunities created by “market demand” (Marris, 2002). Where the market demand is increasing, a firm may see corresponding growth due to demand for its services and products. Unsurprisingly, when this demand decreases the firm may experience a decline in growth in line with a decline in demand for its products and services. Therefore in an ever changing marketplace, SMEs need to grow by creating new profitable opportunities to survive (Dobbs & Hamilton, 2007). The Growing New Zealand Business (GNZB, 2011) study examined a range of possible factors influencing growth, including “management practices for high performance” (p. 8), such as written business and human resource plans, the formalisation and uptake of which contributed to the increase in firm size. This increase in firm size during a period or phase of growth has a number of positive and negative implications. Growth allows a firm to further realise productive opportunities (Kay, 2002; Penrose, 2009 (1959)). *Management Matters* (MED {MBIE}, 2011b) found quality of management is positively linked to enterprise productivity, which in turn creates internal opportunities for growth despite changes in market opportunities.

One such market is the energy industry in New Zealand. The energy industry is responsible for New Zealand’s highest productivity rates, \$330 per employment hour, yet recently this sector has shown reduced employment (MBIE, 2014). When Methanex, for example, invested money in expanding its ethanol plant in New Plymouth (PEPANZ, 2012), many engineering enterprises benefitted (Venture Taranaki, 2012). Venture Taranaki chief executive Stuart Trundle suggests,

“the oil and gas industry creates jobs through the port and engineering firms, but most beneficiaries are self-employed Kiwis and small business owners” (National Business Review, 22 August 2012).

Regionally and globally, negative impacts have a corresponding effect on growth opportunities available in the industry as the CEO of a regional association recently commented, “the tsunami impact has been the slowdown in the Australian economy.” Figure 2.3 illustrates this ever changing market as the change in the imported crude oil and petroleum product has a corresponding effect on

the level of investment in the industry, as illustrated by the value of imported oil and gas pipe in New Zealand.

New Zealand research (MBIE, 2014; MED {MBIE}, 2011b; Simmons, 2002) showed that in recent years large firms have performed better financially than SMEs, suggesting that on the whole, the bigger the firm the better the management practices. Therefore, research on factors of firm growth such as the development of better management practices and internal processes that contribute to the identifying, capture, exploitation and renewing a firm's productive opportunities could contribute to New Zealand's SME success. SMEs that support an important New Zealand export and productivity sector are engineering firms operating in the energy industry. These are firms that employ up to 250 (Organisation of Economic Cooperative Development, 2004) full time employees (FTEs). In an ever changing economic environment, where external factors present opportunities and threats to growth, the strategic response must be of a dynamic and not a static nature. Of the many schools of strategic thought (Mintzberg, 1967; Mintzberg & Lampel, 1999; Porter, 1980) the more recent theoretical dynamic capabilities framework (Helfat et al, 2007; Teece & Pisano, 1994; Teece et al, 1997; Teece, 2009; Winter, 2003) offers a relatively new opportunity to analyse how the firm responds to these external factors (Prahalad & Hamel, 1994) through key firm management skills (Teece, 2007; Teece, 2009). The dynamic capabilities framework appears to offer a plausible framework with which to analyse the dynamic nature of how an SME grows in a dynamic marketplace. This opportunity provides a situation in which to evaluate this strategic framework. The New Zealand energy industry provides an opportunity to understand how;

“the capabilities and the resources framework business opportunities flow from a firm's unique processes” where the “strategy analysis must be situational,” (Teece et al, 1997, p. 529). Dynamic capabilities are “the capacity of an organisation to purposefully create, extend, or modify its resource base” (Helfat et al, 2007, p. 4).

Yet, difficulties arise in understanding dynamic capabilities at a practical firm level and certainly in a New Zealand firm context. Difficulties include the lack of operationalised methodology with which to understand how dynamic capabilities influence firm growth. Recent literature increasingly points to the opportunity for analysis - how dynamic capabilities are associated with firm growth - adding value at both an academic and industry level (Pitelis, 2002; Helfat et al, 2007; Lichtenthaler and Lichtenthaler, 2009; Kuuluvainen, 2012); but does not explain how to go about it. Initially the dynamic capabilities framework referred to firms operating in “demanding environments”, particularly those operating in the high tech sector (Teece et al, 1997). It would be fair to say that the same demanding environment exists today for firms operating in the New Zealand energy industry

as Figure 2.3 illustrates. Furthermore, the managing director of engineering Firm L emphasises the effect a global downturn has on his New Zealand based engineering firm,

“we’ve just had eight months of a massive downturn going from a hundred guys down to 48 or 46 down. And I think Australia has, we’ve got five people left in Australia and we had almost 40 over there. I think the GFC has finally hit the oil industry in Australia.”

The question then is how does a firm such as Firm L defy these market “cycles” and continue to grow? Is the dynamic capabilities framework able to provide a “conceptual lens through which to perceive, explain and predict” (Pitelis, 2002, p. 11) such that firm growth trajectories are able to mitigate external threats and enhance growth opportunities? Teece et al (1997, p. 510) suggest that,

“the dynamic capabilities approach is promising both in terms of future research potential and as an aid to management endeavouring to gain competitive advantage in increasingly demanding environments.”

The missing link in this promising framework though, is a viable method by which a firm’s dynamic capabilities can be measured, to understand their influence on its sustained growth. Because the aim of this thesis is to understand whether dynamic capabilities have an influence on New Zealand engineering firm growth, it is important to understand how firms grow.

The basis for understanding the growth of firms is Edith Penrose’s *The Theory of The Growth of the Firm* (1959) mechanisms of which are subsequently extended by (Kay, 2002). Since the emergence of firm evolutionary theory (Nelson & Winter, 1982), academic analyses of firm activities have developed a more dynamic approach (Helfat et al, 2007; Teece et al, 1997; Teece, 1982; Winter, 2003). Orchestration of a firm’s activities and resources, to establish a competitive advantage, has been identified as a crucial element for its growth (Eisenhardt & Martin, 2000; Helfat & Peteraf, 2003; Teece et al, 1997; Teece, 2009; Winter, 2003). The orchestration of the firm’s resources (often limited in the case of SMEs), through managerial activities and processes, is indicated by the firm’s distinct skills, processes, procedures, organisational structures, decision rules and disciplines (Bingham, Eisenhardt, & Furr, 2007; Teece, 2009). Organisational processes are manifested as repetitive sets of actions enabling managers to achieve tasks (Bingham et al, 2007) – and are able to be measured for effectiveness (Helfat et al, 2007).

Dynamic capabilities are dependent on the unique resources a firm has (Teece et al, 1997; Winter, 2003), resources which when they deliver competencies and capabilities to the firm (Barney, 1991) in a patterned and deliberate manner (Bingham et al, 2007), do so in the form of key processes, delivered by key management skills (Augier & Teece, 2008; Teece, 2007). The challenge is to

understand how dynamic capabilities influence firm growth, as it is not clear as “dynamic capabilities are difficult to identify” (Easterby-Smith, Lyles, & Peteraf, 2009, p. 54). Fortunately, *“lying at the heart of dynamic capabilities are several fundamental management/organisational skills, including: (1) learning and innovation processes; (2) business ‘design’ competence (what business model to employ); (3) investment allocation decision heuristics; (4) asset orchestration, bargaining, and transactional competence; and (5) efficient governance and incentive alignment”* (Teece, 2009, p. 130).

Whilst these are explicated to a degree in Teece’s framework, there is still work to be done to explain what these skills and their associated processes look like in an SME, in particular, a New Zealand SME. The dynamic capabilities framework provides a means of understanding the influence these key processes have on firm growth.

Firm growth needs to be sustainable; according to Helfat et al (2007), “a sustainable advantage is one that persists in the face of competitive efforts” (p. 14). In a globalised economy, New Zealand energy sector firms are exposed to opportunities and threats to grow both within and outside of New Zealand. During periods of extensive investment locally (MED {MBIE}, 2011a) and regionally (Queensland Government, 2011), New Zealand firms (including SMEs) are faced with opportunities to grow. It is expected this thesis will develop an understanding of:

“how a business enterprise and its management can first spot the opportunity to earn economic profits, make decisions and institute the disciplines to execute on that opportunity and then stay agile so as to continuously refresh the foundations of its early success, thereby generating economic surpluses over time.” (Teece, 2009, p. 60).

The researcher observed New Zealand firms in this industry have chosen various ways to address these opportunities and mitigate these threats and exhibiting differing growth trajectories. Seeking to understand what was different within these firms has motivated the researcher to understand how the dynamic capabilities framework influences firm growth.

This thesis is expected to develop an understanding of how engineering firms operating in the New Zealand energy industry not only take advantage of growth opportunities, but also how they fend off threats and continue to grow. But first, a mechanism of measuring the effectiveness of dynamic capabilities on this sustained growth is required. This thesis develops this mechanism.

1.1 Motivation and objectives.

My interest in the subject of firm growth stems from being a shareholder and director in a business that attempted to grow. As directors we aspired to grow the business, with a track record of growing sporadically as temporary competitive advantages came about. Through various mechanisms, not understood fully at the time, the business grew. This growth on the back of limited resources however was not sustained, as the adverse effects of the Global Financial Crisis (GFC) caused growth to stall and then reverse. This experience raised questions of how businesses can grow sustainably without solely relying on market demand conditions (Marris, 2002).

A variety of mechanisms of growth have been observed in the Australasian energy engineering industry in the course of the researcher's work in Australia, New Zealand and the Asia Pacific. Firms have set up offices in other New Zealand locations, to take advantage of different energy engineering opportunities; some have CEOs flying around the world to energy "hotspots" to seek out opportunities; some have owners living in Australia trying to set up a beach head; while others have set up regional offices in states like Victoria, Australia, to embed themselves in the resource sector, and some have set up operational offices in Brisbane as Queensland is a hotbed of energy investment (Queensland Department of Employment, Economic Development and Innovation, 2009). Yet others are simply maintaining the status quo.

At the commencement of the dynamic capabilities discussion, (Chandler, 1992) suggested that, *"the firm would seem to be a more promising unit of analysis than the transaction"*, and understanding *"the concept of the organizational capabilities that permit it to remain competitive, and therefore profitable"* (p. 490) presents a research opportunity.

This study will attempt to shed light on whether a firm exhibiting dynamic capabilities is able to generate economic surpluses over time through sustainable growth. This thesis is expected to contribute to the understanding of what internal criteria a firm in the energy sector, and hopefully by extension what any New Zealand firm aspiring to grow, will need to satisfy in order to do so with maximum efficiency.

The research cases.

As dynamic capabilities are process dependent (Aramand & Valliere, 2012; Augier & Teece, 2008; Bingham et al, 2007), it follows that a qualitative research methodology where firm growth case studies are examined would contribute to answering the research question of "how dynamic capabilities influence firm growth?" Davidsson et al (2005) suggest that "the arms-length, quantitative study of determinants of growth does not put much flesh on the bone to understanding

the issue from a process point of view” (p. 6), further supporting the case for qualitative case study analysis with the added strength of these cases all being bound by the same industry dynamics. To build an understanding of firm growth, case studies were prepared of Firms A to P to develop the depth of insight required to understand a firm’s unique processes (Eisenhardt, 1989). Cases were developed from semi-structured interviews, observations, available market information, and company publications. The firm’s growth was mapped in graphic format. At stages where unique processes were implemented, modified or renewed, a “turning point” or “inflection point” (Garnsey, Stam, & Heffernan, 2006) was analysed for dynamic capabilities processes’ contribution to sustainable growth. The context of the research is fixed as: engineering firms operating in the New Zealand energy industry. In all, fifteen SMEs were considered along with a major listed energy firm (Firm C) and several industry organisations to provide contextual validity. This number satisfies the requirement for the insight required to understand a firm’s internal capability processes (King & Horrocks, 2010).

Firms are grouped into those exhibiting unsustainable growth and sustainable growth. This grouping is designed to verify Teece's (2009) claim that dynamic capabilities enable a firm to generate “economic surpluses over time” (p. 60). Growth is measured a number of ways including; full time employees, profitability, assets and geographic reach (Delmar, Davidsson, & Gartner, 2003; Helfat et al, 2007). In many cases interviewees (CEOs, managing directors and general managers) were comfortable sharing employee numbers and a few were comfortable sharing financial information. These measurement units are utilised as the case analyses are all context dependent. Indications of profitability were provided in all cases, most through the interviews, some through confidentially provided data. The managing director of Firm M for example, when asked about recent profitability of his business replied, “yeah its dropped”, “the accountant would come here today and think we were nuts really.”

Data on the growth of the research case firm were gathered in most cases at interview stage, where the interviewee gave an account of the firm’s growth over time. Interview questions then centred on the period when growth curves changed and processes associated with dynamic capabilities were implemented or changed. Figure 1.1 below illustrates the inflection points (points of interest) of Firm O established from the interviews where growth, profitability or processes changed. The dynamic capabilities processes associated with the key management skills were examined at inflection points at a firm’s growth curve.

Figure 1.1 Growth trajectory of Firm O, indicating inflection points.



The most complicated aspect of dynamic capabilities is that they are difficult to measure (Helfat et al, 2007; Kuuluvainen, 2012; Teece, 2009). Dynamic capabilities have to be explicated in terms of the unique processes they make available to the firm (Bingham et al, 2007). These processes, associated with key management skills, are fortunately described in terms of “micro-foundations” of dynamic capabilities (Teece, 2009). Microfoundations, the inimitable “skills, processes, procedures, organisational structures, decision rules, and disciplines” (Teece, 2007, 2009) underpin dynamic capabilities. From these micro-foundations it is possible to seek out evidence of dynamic capabilities in the research cases. However, evidence of the processes is not enough to qualify a firm as exhibiting dynamic capabilities. These processes must be strategically intentional (deliberate) and contribute to the firm’s evolutionary fitness.

“Evolutionary fitness refers to how well a dynamic capability enables an organisation to make a living by creating, extending, or modifying its resource base” (Helfat et al, 2007, p. 7).

This test for evolutionary fitness is applied when a unique dynamic capability process is encountered. Case studies are examined for evidence of these deliberate and not “ad-hoc” processes.

Firm P deliberately sought out an expansion in services as the managing director commented,

“ten years back, early 2000s, when we decided to expand into different areas and one of those was the (energy industry service)”, “at that time we needed to have some other management to look after those particular aspects.”

These comments provide evidence of deliberate seeking out of target market segments, and supporting this by allocating resources to achieve growth through changing customer needs. This is an example of when the firm deliberately implemented a sensing capability.

Firm H’s growth trajectory included a period as described by the managing director, “from about 2000 we’ve steadily increased our influence in the Auckland market. We’ve really looked at strategically what we’re trying to achieve”, “we are a maintenance and service based company.” This information provides evidence of the deliberate nature of how and when the firm delineates the customer solution and business model, a seizing capability.

Firm N’s managing director provided the insight into how the firm re-engineered its governance structure from 2002,

“we took on another partner in the business. So we had quite strong growth for a period of time. That would have been 2002 I think I moved back to Auckland, 2001 or 2002 I think around that time. So we had quite aggressive growth through that period.”

This change in governance minimised agency issues and established incentives to grow, both key transformational capability processes. A search through the New Zealand companies register (www.companies.govt.nz) was able to confirm the change in ownership structure at that period, providing verification (triangulation) of the research data (Yin, 2010).

The research opportunity is to develop an operational method to understand how dynamic capabilities processes influence firm growth. This method develops the use of dynamic capabilities’ key management skills to seek out evidence of processes associated with their microfoundations. Thereafter, the processes are tested for evolutionary fitness. Further theoretical research was undertaken to enable the identification of these processes. For example an understanding of governance of value chains (Gereffi, Humphrey, & Sturgeon, 2005) assists with recognising a change in business model to better fit the firm’s market and resources.

When examining literature relating to dynamic capabilities, the concept of dynamic capabilities renewal (Ambrosini, Bowman, & Collier, 2009; Helfat & Peteraf, 2003) is not often considered. As key firm resources lose their relevancy in a changing environment (Barney, 1991; Johnson, Christensen, & Kagermann, 2008), so do firm capabilities (Teece & Pisano, 1994). The concept of dynamic capabilities renewal is considered as the fourth research question. In summary the research questions are posed:

- *RQ 1: How do sensing capabilities influence firm growth?*
- *RQ 2: How do seizing capabilities influence firm growth?*
- *RQ 3: How do transformational capabilities influence firm growth?*
- *RQ 4: How does the renewal of dynamic capabilities influence firm growth?*

The search for evidence of dynamic capabilities at certain stages in a firm's growth trajectory is dependent on uncovering the unique processes contributing to the creation, extension or modification of key resources. The nature of the questions in the semi-structured interview was designed accordingly. The first stage of the questions was aimed at uncovering the firm's growth trajectory. Then an understanding of the development of the firm's unique resources was established. Thereafter each dynamic capability management skill was explored to uncover what and when the unique processes were implemented, and in many cases if at all. Validation of interviewees' answers was possible through data gathered from other sources.

1.2 Thesis plan.

The thesis is planned to describe the theoretical foundations of firm growth (Chapter 2), dynamic capabilities in their own right and the challenges with trying to measure the influence dynamic capabilities have on sustained firm growth (Chapter 3). The firm growth chapter is expected to provide a background on firm growth, from the Penrose literature to the development of the resource based view. This background will provide the necessary insight in developing the research cases. This development requires an understanding of growth mechanisms such as Firm A's intentional geographic growth at a period when the local market's opportunity was declining, "we have made the decision that we would like to be in 5 years' time possibly twice the size but not necessarily in NZ. Our aim is to establish a base in Queensland," commented the CEO.

In Chapter 3 the theoretical opportunity of understanding the "internalisation" of the productive opportunity of the firm (Pitelis, 2002) is explored based on the dynamic capabilities framework. The Teeceian dynamic capabilities framework is developed to overcome its weaknesses in terms of what dynamic capabilities are and what they look like. Fortunately recent development of dynamic capabilities literature provides some direction. A criticism of the framework is that it has not been adequately tested as to whether a firm that exhibits dynamic capabilities sustains its growth over time, at least in a New Zealand context.

The context is the energy industry in New Zealand, and Chapter 4 provides an understanding of the economic environment in which engineering firms operate in. This industry is prone to many international threats as suggested in 1.1 above. Local threats include changes in legislation as the CEO of Firm C attests, “I think the other big risk is the political risk, that there’s regulation and legislation that stifles innovation and/or impedes it.” Chapter 4 concludes that this industry is sufficiently volatile to satisfy the requirement that the dynamic capabilities framework is applicable in “fast moving business environments open to global competition, and characterised by dispersion in the geographic and organisational sources of innovation and manufacturing” (Teece, 2009, p. 4). Chapter 5 details the methodology used in this study and develops a mechanism by which dynamic capabilities can be measured for “evolutionary fitness” and their influence on sustained firm growth. Multiple case studies were prepared from data gathered from semi-structured interviews, provided firm information, publically available information and observations. The reason for this choice of methodology is outlined commencing from how to measure dynamic capabilities (Helfat et al, 2007) by examining related processes (Bingham et al, 2007; Easterby-Smith et al, 2009; Eisenhardt & Martin, 2000) at an inflection point along a firm’s growth curve. The data gathering technique is justified and the method of presentation of the data with which to build the case study is described. Codes are used in the data disassembling process and visual aids (Eisenhardt & Graebner, 2007) are used extensively to reassemble (Yin, 2010) the data. The visual aids are used throughout this thesis to develop an operationalised understanding (Garnsey et al, 2006) of dynamic capabilities and growth.

The research cases are presented in Chapter 6 outlining the exhibited dynamic capability processes at the relevant inflection point. Chapter 7 then sorts these case studies into two categories, firms exhibiting unsustainable growth and those that exhibit sustainable growth in order to fully examine whether (and which) dynamic capabilities influence firm growth. The concept of dynamic capabilities renewal processes is also discussed in the third part of Chapter 7. The three sections of Chapter 7 summarise the dynamic capability management skill and renewal processes in order to answer the research questions.

Chapter 8 discusses these findings in relation to the research questions and Chapter 9 presents the conclusions able to be drawn from this research.

Chapter 2: Firm Growth

2.1 Introduction.

According to industry organisations Q and R, many engineering firms they represent in New Zealand are SMEs, those that employ up to 250 (Organisation of Economic Cooperative Development, 2004) full time employees (FTEs). The director of organisation R commented on his membership, “it’s clearly the majority is in the SME, small SME space, 20 below”. In order to survive in a changing marketplace by creating new profitable opportunities, firms need to grow (Dobbs & Hamilton, 2007). Firms often grow from the external opportunities created by “market demand” (Marris, 2002). Correspondingly, firms also decline when markets decline.

The Methanex expansion (PEPANZ, 2012) realised a growth opportunity for many engineering firms, many of which are SMEs (Venture Taranaki, 2012). Growth was realised for New Zealand firms such as A, L, O and P in Queensland from investment in the oil and gas sector in Queensland (Queensland Government, 2011). Regionally and globally, positive and negative impacts have a corresponding effect on growth opportunities and threats in the industry. The managing director of Firm L commented, “we, like a lot of other New Zealand companies that go to Australia have been beaten up really badly in Western Australia, Northern Territory.”

In an ever changing economic environment, where external factors present opportunities and threats to growth, the strategic response must be of a dynamic and not a static nature. Dynamic capabilities are said to provide for a firm a mechanism for firm growth (Helfat et al, 2007) and wealth creation (Teece et al, 1997), yet most studies on dynamic capabilities have only focussed on identifying their relationship to a certain feature of a firm’s performance. The performance features considered include; knowledge management (Lecler & Kinghorn, 2014; Zollo & Winter, 2002); innovation (Leonard-Barton, 1992; Nolsøe Grünbaum & Stenger, 2013), management capabilities (Beck & Wiersema, 2013) and internationalisation (Foley & Fahy, 2009; Kuuluvainen, 2012). Whilst these studies do add value to elements of firm growth and performance, they do not address the issue of whether dynamic capabilities influence firm growth. A basis for understanding the growth of firms is Edith Penrose’s *The Theory of The Growth of the Firm* (1959) and subsequently extended by Kay (2002) and others.

Firm growth is a complex matter, particularly for business owners to consider. The case studies reveal a variety of attitudes to growth. When asked whether they aspire to grow, the case study firms’ answers illustrate these diverse attitudes:

“Yes we do. To what extent I guess is the question of time and energy. Like at the moment now that I am taking over the business I am thinking that I can do it. Renewed vigour and renewed risk appetite and I just want to throw it all out there and grow it as quick as we can, as much as we can. But I suspect it’s like starting off on a long tramp, it’s really exciting and then two days later you sort of settle down to a pace, you know, a week after that you work out exactly how far you do want to go” (managing director, Firm B).

“No, not at all no but we just wanted to stay the way we were because one bloke can control 25 staff without too much trouble you see” (managing director, Firm M).

Penrose’s thoughts on firm growth include two diverse meanings, namely increase in quantity and an improvement in quality. Growth “denotes merely increase in amount; for example when one speaks of ‘growth’ in output, export and sales”, and “increase in size or an improvement of in quality as a result of a process, akin to natural biological processes” (Penrose, 2009 (1959), p. 1). This analogy with the natural world led to the emergence of firm evolutionary theory (Nelson & Winter, 1982). Since then, analyses of firm activities have developed a more dynamic approach (Helfat et al, 2007; Teece & Pisano, 1994; Teece et al, 1997; Teece, 1982).

The distinguishing feature of Penrosian industrial firms (as opposed to financial firms, holding companies and cartels) is they are comprised of “organised administration and productive activities”, (Penrose, 2009 (1959), p. 166). Orchestration of a firm’s activities and resources, to establish a competitive advantage, has been identified as a crucial element for its growth (Augier & Teece, 2007; Eisenhardt & Martin, 2000; Teece et al, 1997; Teece, 2009; Winter, 2003). The firm is able to sustain growth through managerial activities and processes manifested in the distinct skills, processes, procedures, organisational structures, decision rules and disciplines (Teece, 2009).

Firm growth is a measurement of firm performance (Helfat et al, 2007). This thesis is not intending to directly address the question of how a firm grows due to external opportunities or how it persists in growing despite external threats. Instead it is attempting to answer the question of how a firm’s opportunities are derived from internal productive activities (Penrose, 2009 (1959)). As the dynamic capabilities framework seeks to explain how “managerial processes”, “support productive activity” (Teece & Pisano, 1994, p. 541) it therefore presents an opportunity to understand how these productive activities influence firm growth. It would be useful then to understand what constitutes firm growth and what this may look like in order to understand the underlying productive activities. The first section, 2.2, discusses market led growth in the context of the New Zealand energy industry. Case studies are provided to illustrate how the energy industry provides the opportunities and presents threats to growth. The next 3 sections, 2.3, 2.4 and 2.5 discuss the mechanisms of growth,

the phases of growth and the role of managers in firm growth, all internal aspects of firm growth. The final section opens the discussion on the question of whether dynamic capabilities influence firm growth.

2.2 The effect of the market on firm growth.

External market change is generally something the firm has no control over (Marris, 2002) yet many firms' fortunes are tied to the fortunes of their industry. The Penrosean firm is "a collection of productive resources the disposal of which between different uses and over time is determined by administrative decision" (Penrose, 2009 (1959), p. 21). External economic environment factors such as the price mechanism affects the way the firm allocates resources (Coase, 1937). The external environment has an effect therefore on the decisions made by a firm.

If a firm has the strategic intention of remaining competitive, changes in the firm's external environment then demand a change in firm resources (Rumelt, Schendel, & Teece, 1991). Mechanisms by which the firm can change these resources are varied (discussed in detail in 2.3 below). Firm K is such an example, (see Firm K case study). The firm recognised the need to rely less on a local geothermal market and expand its service offering offshore (multinational expansion). The resource requiring change, was the skillset enhancing the ability to market to a regional and global customer base. The introduction of marketing skills shifted the core of Firm K's business resources away from pure technical skills which up to that point had delivered sustained firm growth.

Many of the case study firms operating in the wider energy industry in Australasia experience increases and declines in growth in synch with regional and global indices. Whilst New Zealand does export crude oil (in the form of gas condensate) and refine oil into a multitude of products, the crude oil produced is not compatible with New Zealand's refining capabilities (Refining New Zealand, 2012). Figure 2.1 illustrates the imported price index of New Zealand oil and petroleum products, largely dependent on the global oil price (PEPANZ, 2015). Figure 2.2 illustrates the value of imported pipe for the oil and gas industry. Since this pipe is not manufactured in New Zealand (HERA, 2013) , the value is able to be tracked through import statistics and forms a reliable index of investment in the industry. Reliable to the extent that none of the imported product is being stockpiled.

Figure 2.1 – New Zealand imported oil and petroleum products price index (www.stats.govt.nz).

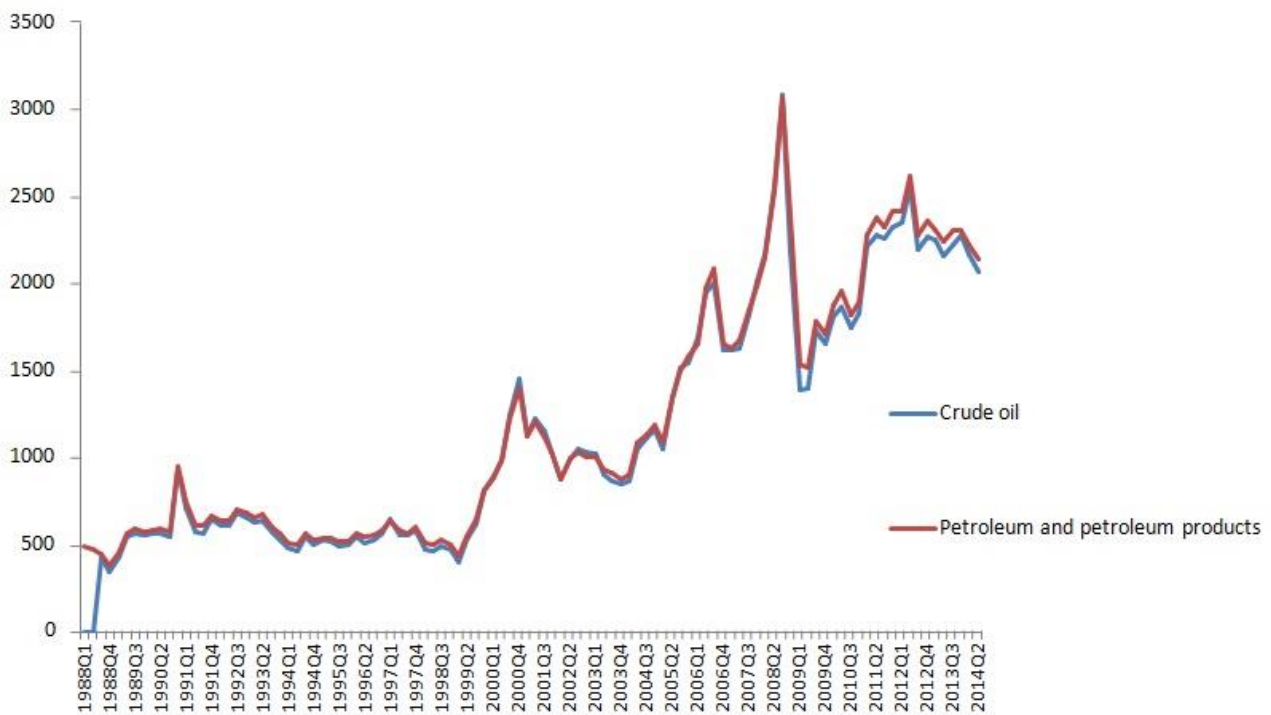


Figure 2.2 – New Zealand value of imported pipe for the oil and gas industries (www.stats.govt.nz).

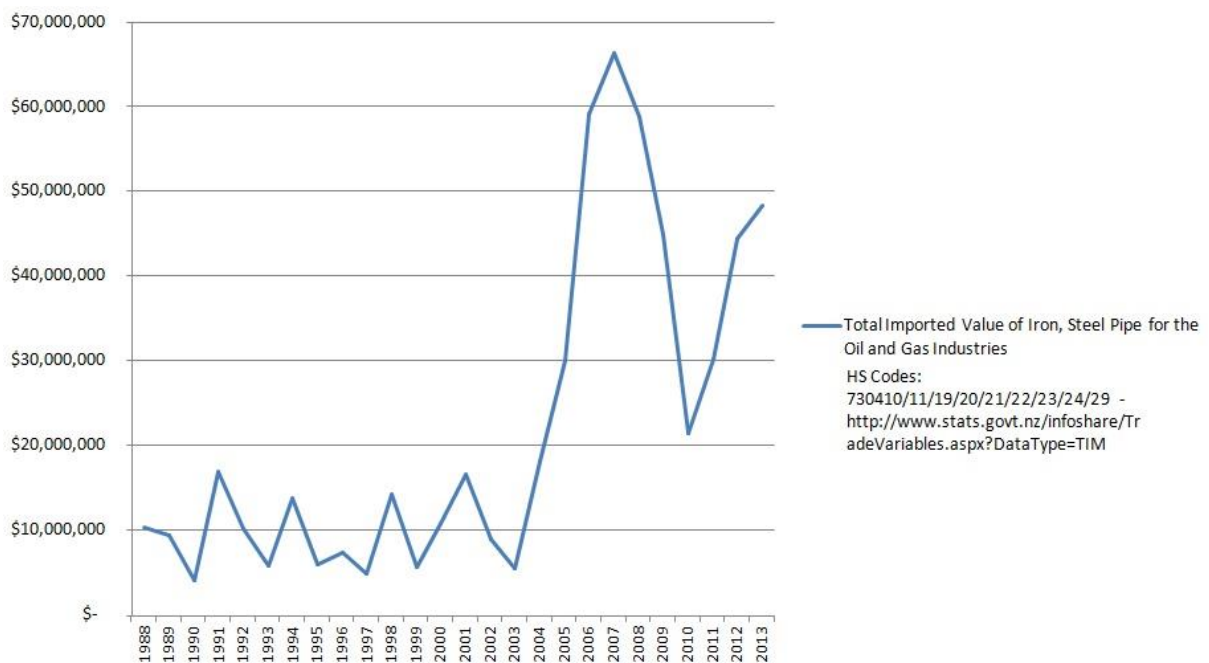
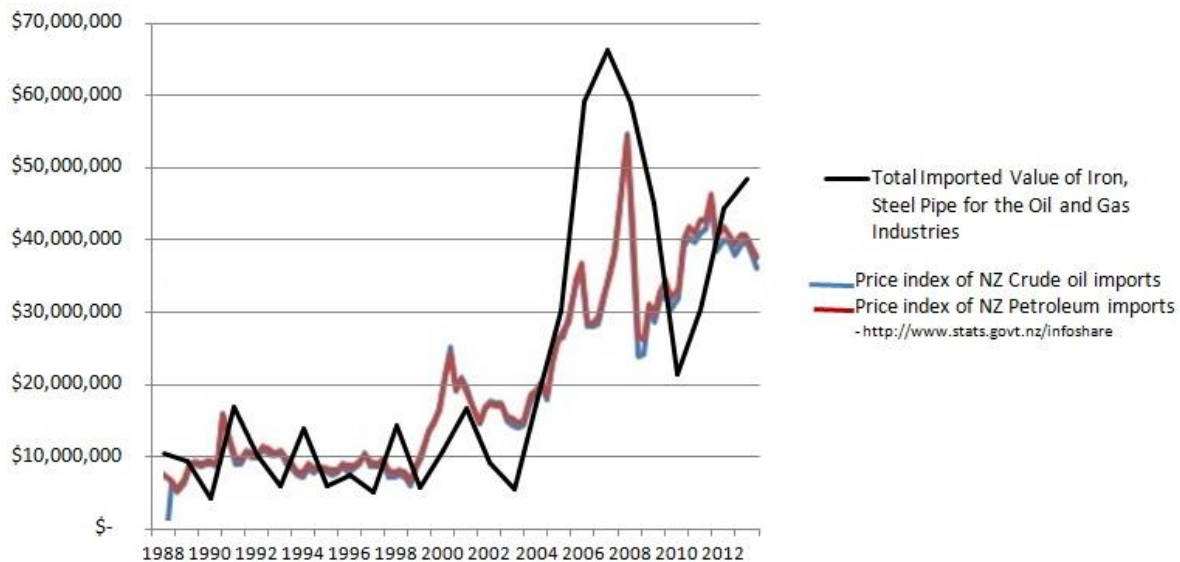


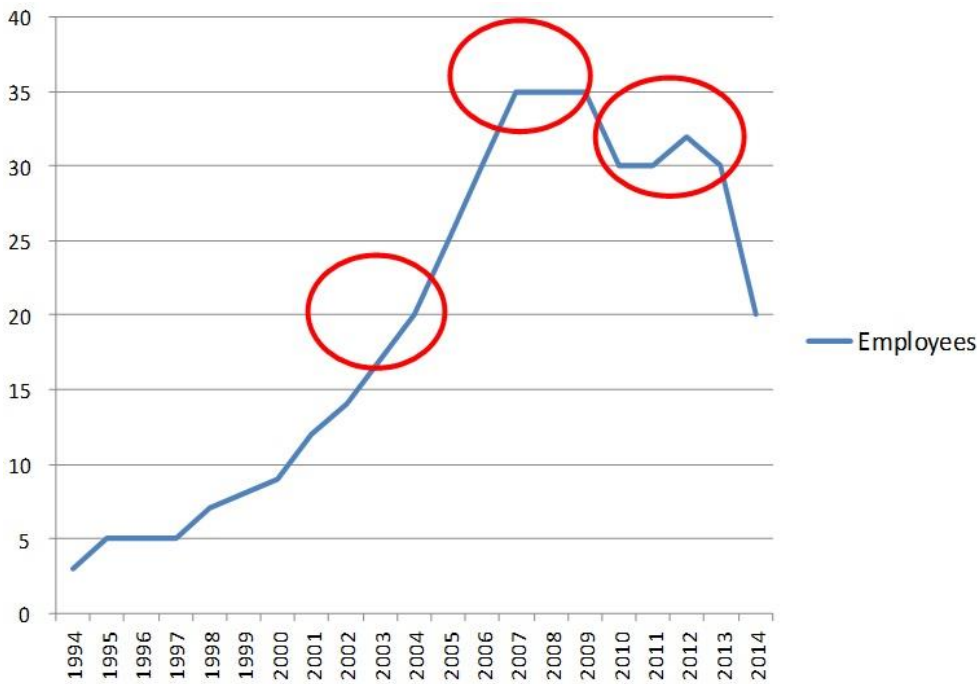
Figure 2.3 superimposes the above indices that illustrates the effect imported crude oil prices have on imported pipe used in the oil and gas industry in New Zealand. The curves illustrate a relationship over time. Therefore, global impacts have an impact of investments in the oil and gas industry in New Zealand.

Figure 2.3- Total imported value of iron, steel pipe for the oil and gas industries and price index of NZ crude oil and petroleum imports (www.stats.govt.nz).



Firm F (Figure 2.4) is a fabricator of pipe and equipment for the oil and gas industry. Firm F’s growth trajectory peaks and troughs follow the peaks and troughs in this particular industry index; key market led growth inflection points are illustrated by the red circles. In the context of this research, when the external environment changes as Figure 2.3 illustrates, activities of the firm need to change (Penrose, 2009 (1959); Schumpeter, 1947) in order for the firm to sustain growth. Figure 2.4 suggests Firm F should implement some internal changes as its growth follows its main market index. Understanding the mechanisms of growth is necessary to understand the processes that lead the firm to use resources (often limited in the case of an SME) to achieve sustainable growth.

Figure 2.4 - Firm F growth trajectory indicating demand driven inflection points.



Interviewees of the case study firms also commented that other market factors affect its growth opportunities, such as the behaviour of large firms. The managing director of Firm L commented, *“I thought I’ll contract to the oil companies because they’ll never go broke. But they act like a cartel, they dictate the terms.”*

Large firms also have their complaints about factors outside of their control, as the CEO of Firm C suggests that,

“in the regulation space the adaption is difficult because of the regulatory environment because you are kind of very constrained.”

These market factors are discussed in more detail in Chapter 4. Over a period of time a firm may exhibit growth and decline in accordance with industry “business cycles”, such as Firm F (Figure 2.4). The challenge is to explain how a firm rebounds after or even defies the downturn in these “business cycles” and continues to grow, such as Firm P (Figure 2.5) and Firm E (Figure 2.6).

Figure 2.5 – Firm P growth trajectory.

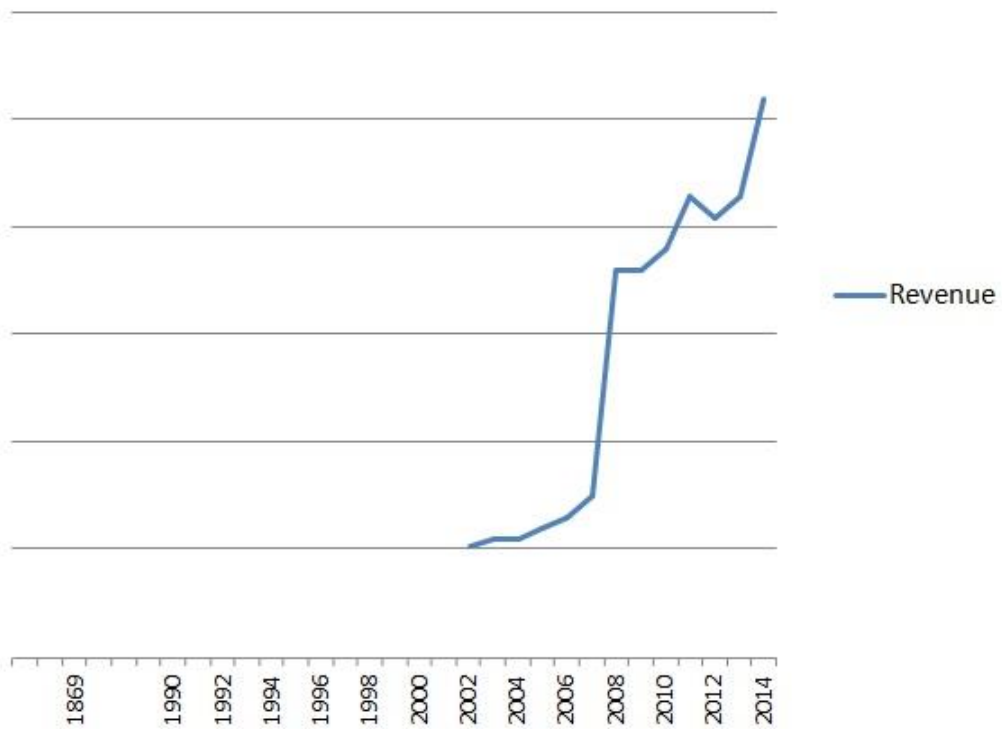
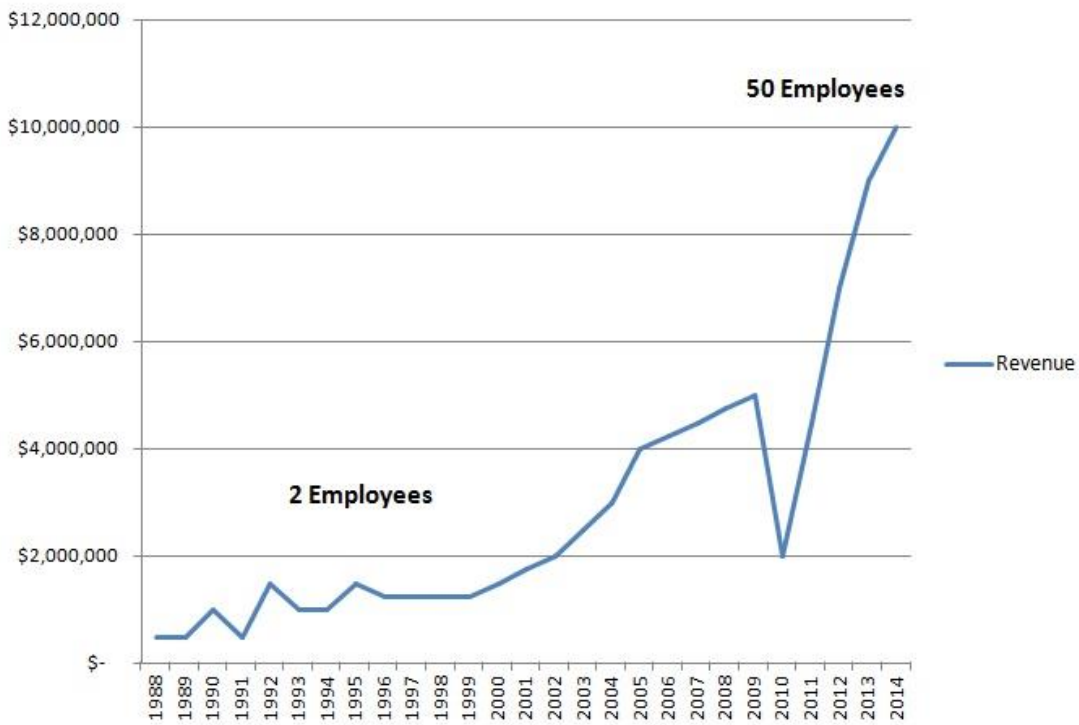


Figure 2.6 – Firm E growth trajectory.



Firms also grow through “existing resources and market areas”, enabling them to create new markets for diversified products and services (Kay, 2002). There is a strong element of management capability in identifying these future markets and possibilities within existing ones, as Helfat et al (2007) suggests. Management abilities vary, as observed in the research cases, a consistent factor of Penrose’s limitations of firm growth. The CEO of Firm I identified that staff literacy levels were such that they limited productivity gains, and hence the contribution to profitability. The CEO commented in this regard, “there are real breaks there to productivity gain just because it slows down the rate of change and the rate of feedback.” Previous management had not addressed this limitation.

Possessing linkages, ties (Granovetter, 1973) and relationships (Davidsson & Honig, 2003; Granovetter, 2005) with external partners, collaborators, suppliers, board members for example allows a firm to leverage off its internal knowledge and diversify (Kay, 2002; Macpherson & Holt, 2007). The strength of this leverage is synonymous with knowledge acquisition of the firm (Kogut and Zander, 2003); knowledge acquisition being a key dynamic capability (Augier & Teece, 2009; Lecler & Kinghorn, 2014). Human resource linkages are one possible resource available for firm growth and whilst Penrose (1959) does not outline this factor specifically, she does define resources as rendering a “productive service”. In an entrepreneurially oriented (Quince and Whittaker, 2005) firm this productive service resource is determined by the motivated entrepreneur (Shane, Locke, & Collins, 2003), who could be the CEO, managing director, general manager for example: someone able to influence the strategic direction of the firm.

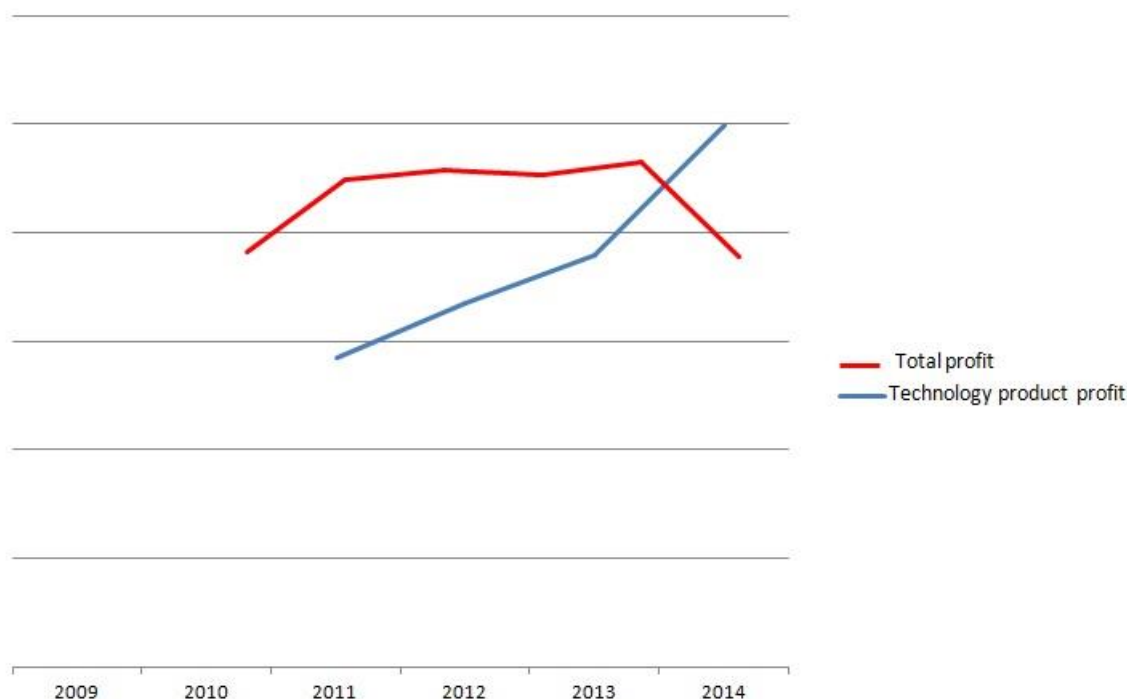
Despite limited resources, motivation for a smaller firm must therefore be to grow in order to respond more effectively to external threats. But growth for growth’s sake is not necessarily desirable or sustainable. The challenge for any firm is to grow profitably. Profitable growth is important as opposed to growth for growth’s sake (Davidsson, Steffens, & Fitzsimmons, 2009); as Shumpeter (1947) suggests that is where a firm’s capacity for innovation lies and hence it’s creation of a productive opportunity through innovation. The suggestion is that a firm which is able to derive above average profits indicate it has a strategic competitive advantage and hence is able to invest in itself to sustain growth.

Firm growth due to advantageous economic conditions does not last forever. Penrose suggested, *“If we can further establish that there are significant factors expanding the productive opportunity of a firm and causing it to change in a systematic way over time with the operation of the firm, we are on the trail of a theory of the growth of firms”* (1959, p. 38).

Firms also grow by responding to external market related threats as has been described above. This means firms must actively consider disassociating their future success from their current products

and services. The entrepreneur can either respond in a creative manner or can passively accept the uncertainty experienced by a firm in the face of changing markets. Firm size does render the firm more capable of responding to threats as the examples of Firm C and P illustrate. The response by a larger firm benefits from the larger resources available to it. Firm C, a large listed energy company was able to sense early on that its traditional business was not going to sustain it into the future. The CEO of Firm C illustrates the focus on reviewing applicability of resources by commenting, “there’s kind of strategic direction for the different parts and we look at the portfolio as an overall and say where do we sit from a capital allocation perspective, where do we want to invest more time and effort, and what the type of investment it is.” Through Firm C’s resources it was able to establish a technology division that is growing at a rate far higher than its traditional business as illustrated in Figure 2.7. Firm P was able to diversify into an energy portfolio relatively easily when it had reached a certain size. The managing director of Firm P recognises that size does matter when assessing opportunities for growth, “I could see being a bigger business gave more opportunity to do that (grow) and being nationwide we can swap gear around all over the place.”

Figure 2.7 - Firm C profits from technology division vs total profits (indexed).



Marris (2002, p. 65) asks,

“thus one can build a ‘demand side’ of firm growth theory, but what about the ‘supply’ side?”

This thesis is attempting to answer how a firm is able to ensure relevant, competitive and sustained capabilities are supplied to it within the ever changing market. As dynamic capabilities provide a

framework with which to do this, they are suggested as a means to analyse a firm's internal mechanisms of growth.

2.3 Mechanisms of firm growth.

In order to identify growth when examining how dynamic capabilities influence firm growth, it is necessary to understand the mechanisms of growth. The interview of the CEO of Firm A revealed that the firm has grown by adding, "a person onto the team and by going out and buying companies" from 2008. When transposed on the firm's trajectory, Figure 2.8, it is possible to see that from 2008 the firm grew in FTEs. Understanding that Firm A grew through technological base augmentation and thereafter pursuing a multinational enterprise model through collaborative activity (Firm A case study, Chapter 6), offers insight into the processes behind the growth.

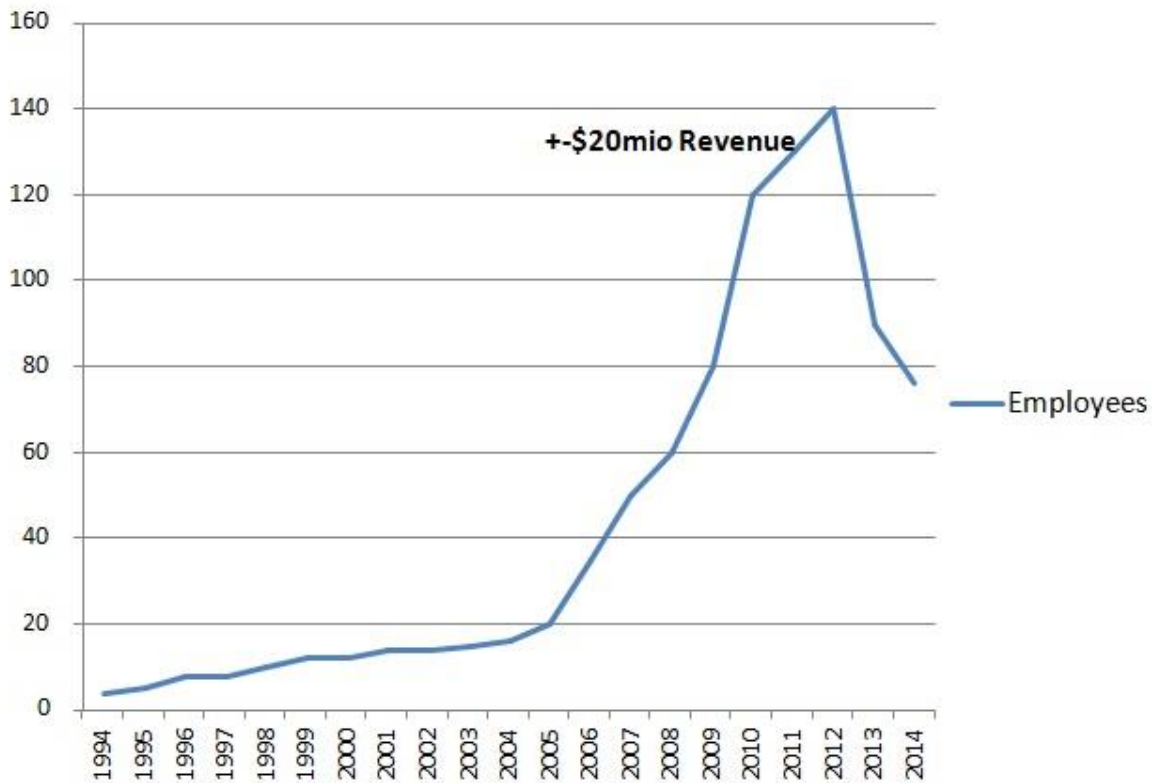
Figure 2.8 – Firm A's growth trajectory.



Firstly it is important to identify whether the process has been deliberate or intentional, as the CEO of Firm A commented when asked about growth due to expanding technological bases through skill acquisitions, "we've had to find good people because the standards we set", "we're looking to the future to that our business plan for them is to get into more infrastructure."

Firm G in contrast grew steadily for a period but its strategic intentionality is unclear as the general manager commented on the firm’s growth strategy from 2006 onwards, “go hard, get a job and just do a job, that’s it.” Firm G’s growth trajectory is illustrated in Figure 2.9.

Figure 2.9 – Firm G’s growth trajectory.

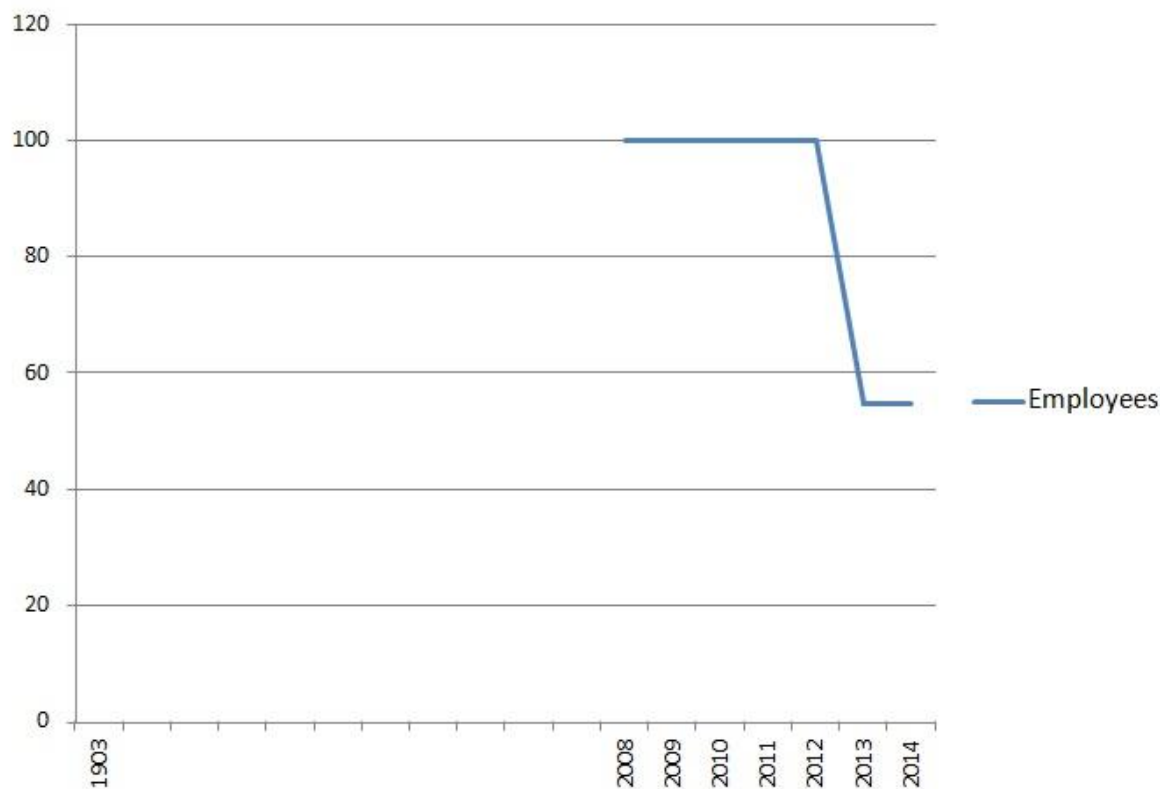


Firm A and Firm G are two firms with apparently similar growth curves, yet one firm has created a “productive opportunity” and the other has not. In attempting to answer how a firm sustains its growth over time, evidence of dynamic capabilities and their influence on growth is sought.

If firms which establish a “productive opportunity”, essentially through internal abilities, are able to establish a profitable opportunity then possibly looking for growth in revenue or firm size is not the outcome which will lead a firm to sustained growth over time. Divestment for example may, “enhance access to both internal and external sources of capital, and in turn enable the firm to fund internal and external growth opportunities” (Kay, 2002, p. 96). Therefore it is prudent to understand this feature of growth prior to forming a judgement on whether a firm exhibits a sustainable growth curve or not. Firm I (Figure 2.10) provides such an example, where after many years of flat growth and static profits the firm divested in a production facility and released a better profitable outcome as the “profitability has increased significantly in the last four years” (CEO of Firm I). Whilst the profitability was attributed to better performance overall, the firm had also intentionally reduced its

staff complement as a result, as the CEO commented “we had a GM here and a GM position in Perth”, and an indication of further divestment in human resources “we have two sales managers as a result of that structure, an operations manager, a health and safety manager and a finance director. So five people who report into the chief executive role. I think logically we will down size.”

Figure 2.10 – Firm I’s growth trajectory.



The examples above illustrate each firm has a unique growth trajectory, further developed in Chapter 6, The Research Cases.

Penrose in her influential study of the Hercules Powder Company (Penrose, 1960) identified several of these mechanisms. Kay (2002) furthered this study many years later to arrive at several growth mechanisms a firm may undertake, such as multiple resource linkages, technological bases, market bases and multiple sources of linkages.

Whilst this study is not primarily concerned with the type of mechanism of growth it is important to identify these mechanisms when analysing how the firm creates, deploys and reconfigures resources in the intentional pursuit of growth. These mechanisms are comprehensively described in Penrose’s *The Theory of the Growth of the Firm* (1959), the Hercules Powder Company case study (1960) and latterly added to by Kay (2002). The growth mechanisms are namely; multiple resource linkages, technological bases, market bases, multiple sources of linkages, related-linked expansion, response

to external threats, vertical integration, links as a weakness and shifting cores, divestment, multinational enterprise, internal influences and collaborative activity (Kay, 2002; Penrose, 1960; Penrose, 2009 (1959)). These are briefly summarised with key identifiers in Table 2.1.

Table 2.1 - Summary of growth mechanisms and key features from (Kay, 2002).

Growth Mechanism	Description	Outcome	Key Feature
Multiple resource linkage.	The supply, manufacture and sourcing of different products and services use the same firm resources.	The firm is able to expand supply or sourcing using existing resources.	“different activities in the firm sharing a bundle of different resources” (p. 86).
Technological bases facilitating diversification.	The firm’s technological resource is able to be leveraged to introduce new products or services.	Growth in product or service offering to existing and new markets.	“developments along the technological route led the firm into new market opportunities” (p. 86).
Market bases facilitating diversification.	The firm’s market bases provide a route for diversification opportunities.	Growth in product or service offering to existing markets.	An existing market base is a “platform for expansion of different (products)” (p. 88).
Multiple sources of linkages.	Linkages within the firm are able to be harnessed to increase firm diversification.	Growth in R&D, product and service offering to existing and new markets.	Diversity of activities, “reinforce the resource base”, “to create increased future diversity.” (p. 88).
Related linked expansion.	Internal products and processes are linked directly and indirectly to each other.	This linkage offers the firm a growth opportunity through diversification, offering more products and services to new and existing markets.	“individual products are at least indirectly linked to most other products in the firm” (p. 89).
Response to external threats.	The firm seeks out new opportunities as a defence mechanism.	Creative responses such as R&D, market related and technological expansion offer the firm growth opportunities in the face of existing threats.	“seek growth opportunities away from the threatened sector” (p. 89).
Vertical integration.	A firm integrates its existing resources into its supply or customer base.	Firm size increases. The firm may realise benefits externally from vertical integration.	Vertical integration as “a special form of diversification” (p. 92).
Links as a double-edged sword.	Links provide a source of economies and also internal threats.	A firm can develop strategies to ward off internal vulnerabilities and leverage of existing linkages.	“both a source of internal economies and potential vulnerability to external threats such as Schumpeterian processes of creative destruction” (p. 94).
Shifting core.	The original core resource may not be impregnable, a firm has emerging bases on which to derive a strategic advantage.	Growth is derived from a Schumpeterian renewal mechanism.	The firm’s “attitude to bases could be characterised better in terms of relative flexibility” (p. 95).

Divestment.	A firm may choose to relinquish assets, products or processes to free up resources to grow further.	Sustainable growth can only be achieved from a profitable position. Intentional divestment represents an opportunity to fund internal and external growth opportunities.	“divestment may not necessarily signal an end to interest in growth, but may be an integral part of such a strategy” (p. 96).
Multinational enterprise.	A firm utilises the same links as above to expand internationally.	Revenue, profits or even firm size growth result from MNE expansion.	“managerial resources necessary for expansion would now”, “be contained within the foreign subsidiary” (p. 97).
Collaborative activity.	Many forms of collaboration exist, merger, joint venture, licensing, sub-contracting, alliances for example. They all seek to maximise efficiencies within the new market or venture.	Growth manifests in a range of forms; revenue, market, product and service offering, geographic.	Collaboration offers, “efficiency advantages” (p. 98).

Whilst internationalisation is not described in her analysis, Penrose does suggest that internationalisation as a natural outcome of firm growth. Internationalisation as a growth mechanism is important in a global marketplace, and the shortcomings in this regard of the Penrose and Kay mechanisms can be overcome under the multinational enterprise category by taking into account elementary internationalisation literature (Johanson & Vahlne, 1977; Johanson & Vahlne, 1990), and more recently that of the “born global” enterprise (Moen & Servais, 2002). None of the case study firms are truly “born global”, but it is constructive to take note that many of the managing directors of these firms had global experience and the necessary skills in their field prior to setting up in New Zealand. In these cases it is also worth considering the benefits previous experience brings to firm growth (Davidsson & Honig, 2003; Koryak et al, 2015), if only to identify the unique dynamic capability processes associated with knowledge.

Examples of the above would include Firms F, H, L and N. Some firms such as Firms A, C, D, K, L, O and P have or are actively pursuing regional or global growth opportunities. Understanding the firm’s intentional processes behind the internationalisation mechanism of growth will offer insight into whether these processes meet the dynamic capabilities threshold. As with other mechanisms of growth, identifying them in the case studies is important in order to understand the underlying processes. As dynamic capabilities processes depend on strategic intent in order to be evolutionary fit (Helfat et al, 2007), understanding the firm’s growth strategy will support an understanding of a firm’s strategic growth processes.

These processes are in turn dependent on their internal resources (Barney, 1991; Beck & Wiersema, 2013; Kraatz & Zajac, 2001). When analysing how dynamic capabilities contribute to sustainable firm growth, the New Zealand energy industry provides a constant context. This context provides an opportunity to understand how firm growth is affected by the market and hence provide an opportunity to discover how dynamic capabilities influence firm growth.

2.4 The phases of firm growth.

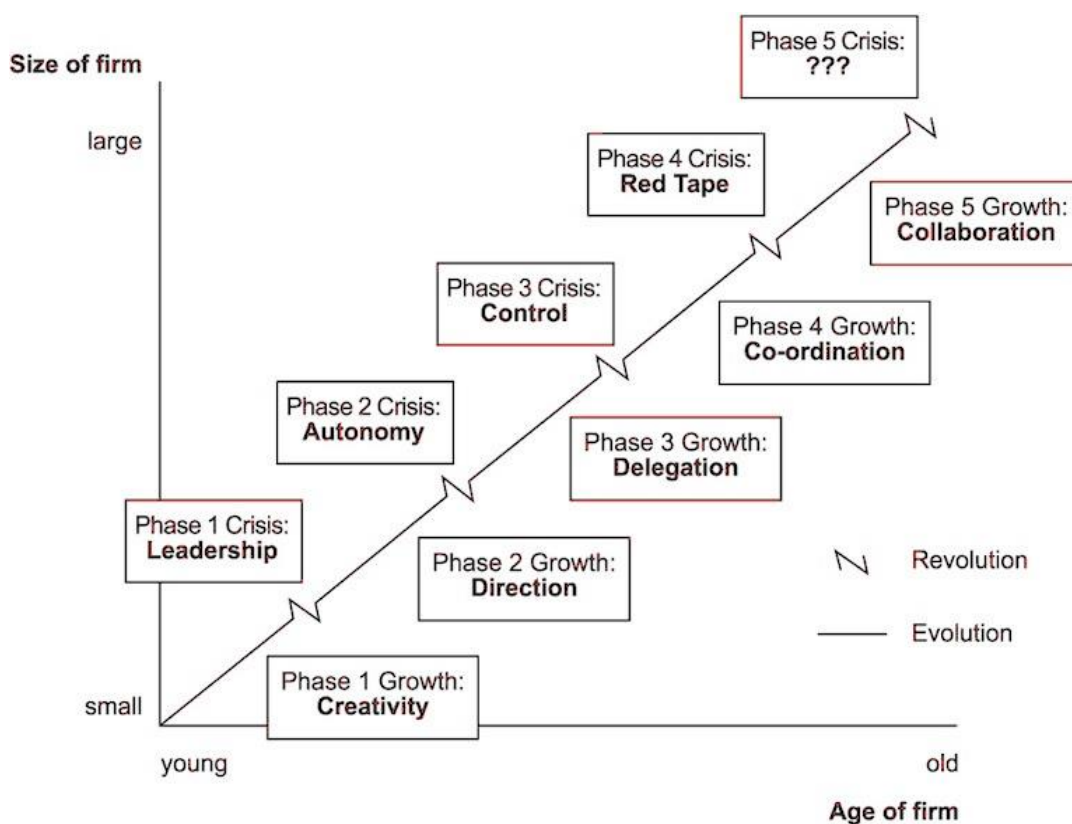
As a firm grows, it experiences challenges relating to internal complexity and limitations. Penrose's discussion on this subject falls short when she suggests that a firm has been "successfully established", when "the disorganisation accompanying very rapid growth has been eliminated" (1959 {2009}, p. 167). Successful establishment implies a static end. As with product lifecycles (Day, 1981; Kotler, 1965; Stark, 2011), phases of a product's life require different approaches in (product) management. The same philosophy drives the concept of capability lifecycles (Helfat & Peteraf, 2003), that describes the continuum from obsolescence of firm capabilities to renewal, offering new opportunities for internal growth.

Whilst this concept is addressed in more detail in Chapter 3, it serves to frame how with firm size comes complexity that needs to be met with a change in capabilities in order to sustain growth. The evolution, revolution model (Greiner, 1998 {1972}) details how a firm needs to change internal factors to adjust to pressures brought on by the changing needs of each phase of growth (Figure 2.11). For instance, as a firm grows from a start-up, a stage will be reached where the direct creative input of the entrepreneur will be stretched to such an extent that a crisis develops. In resolving this crisis through implementing certain processes successfully, the crisis may be overcome. The processes implemented to solve this first crisis enable the firm to grow further until they become a limitation to growth, or possibly as Penrose suggests "limitations of management." Once again solving these limitations is not the end game according to Greiner, but the start of the next phase of growth.

This inquiry is looking at the set of capabilities that may not necessarily avert the crisis, but at least minimise it. In the case of Firm E, once the entrepreneur reached a certain size he realised he became the limitation to growth and offered shareholding to key staff one of whom became, "really the backbone of the business in terms of skills, manual skills and teaching people how to do things properly and encouraging the right safety and quality mentalities."

Greiner's theory suggests that, "the critical task for management in each revolutionary period is to find a new set of organisational practices that will become the basis for managing the next period of evolutionary growth" (1998 {1972}, p. 5). It is precisely these changes in "practices": that (in Teeceian terms) are derived from, "distinctive processes support the creation, protection, and augmentation of firm specific assets and competencies; all vital elements in the strategic renewal process" (Teece, 2009, p. 107). Therefore, having an understanding of the firm phases of growth, as illustrated in Figure 2.11 and explained below, by the researcher in the cases would assist in identification of inflection points of a firm's growth trajectory.

Figure 2.11 – The five phases of growth (Greiner, 1998 {1972}).



Describing the evolutionary and revolutionary phases is useful in order to identify a particular phase, its features and challenges, in order to assess whether a response is intentionally strategic in nature, "evolutionary fit" (Helfat et al, 2007) or even has an "internal fit" with its environment (Siggelkow, 2001). The processes behind the successful transition through the phases are synonymous with how a firm senses and seizes its internal opportunities and threats, and transforms its internal characteristics (resources) to grow.

The first phase of growth Greiner identifies is the creativity phase, featuring entrepreneurially oriented owners, seeking to meet production needs and market simultaneously. Lack of resources

are a distinct challenge in this phase and when opportunities present themselves, the entrepreneur responds despite restricted capital and other resources. However, as the firm grows the practices of managing such a firm become increasingly irrelevant and a crisis of leadership develops. Greiner suggests that the firm is able to pull itself out of this crisis by being able to “locate and install a strong business manager who is acceptable to the founders and is able to pull the organisation together” (1998 {1972}, p. 6).

Once this crisis is overcome, a period of evolutionary growth, the key feature of which through strong leadership is a more hierarchical organisation featuring formal processes, directive and responsible managers. Once this organisation becomes larger, complexities due to its increased size render these formal processes and hierarchy a limitation as a crisis of autonomy results. Overcoming this crisis requires a strong delegation model, where the key feature is a decentralisation of the organisational structure such as what Firm P did when it embarked on a program of,

“removing ourselves directly from the operational area if you like and that was in conjunction with our plan to keep on developing CEOs because we thought well we can’t put CEOs in charge of a business and then sit in the same office, you know” (managing director of Firm P).

The next growth phase Greiner identifies is the delegation phase as one where the key managers have the freedom and incentives to respond and expand into markets with greater authority. But once these autonomous units of the firm start to operate independently and become increasingly isolated from the organisational structure, a crisis of control develops. The firm must then implement different groupings to better use resources and foster better communication between groups. Once the firm is able to implement these changes it moves onto the next evolutionary phase of coordinating the vast spread of business units, skills and firm resources across multiple markets. This coordination requires an overarching administrative structure to coordinate these varied business functions.

Despite Firms C, G, O and P being larger than the rest, it would appear that only Firm C, turnover of approximately NZD 1,000,000,000 would have achieved this phase of growth. Firm I may have been near that phase just prior to divesting itself of its overseas business unit.

In the next phase of growth, better use of resources coordinated by an overarching structure, works until a crisis of red tape is encountered. Features of this crisis include; the administrators’ unfamiliarity with those they are directing causes resentment and bureaucracy takes hold stultifying any further growth. The way out of this crisis is to rely on interpersonal relationships as a way out of the red tape. Features of this evolutionary phase include the firm working in teams of professional individuals. None of the case study firms appear to have entered this phase of growth. The phase

of growth theory appears to be formulaic and sequential as per figure 2.13 and briefly described above. Yet it was observed in the case studies that firms in a similar phase of growth, when faced with crises respond in very different ways (Thomson, 2016). When the entrepreneurially driven Firm B reached the limit of growth with 3 shareholders, two of them were bought out by the third that immediately removed the problem of a crisis of leadership and the firm moved seamlessly into the direction phase of expansion with a clear direction now being provided by the single owner and manager. Immediately thereafter Firm B employed an operations manager that allowed the firm to pre-empt the autonomy crisis and establish a delegatory style of management. As small as this firm is (NZD1mio turnover), it responded quickly such that the managing director was able to focus on business strategy rather than work directly in it. The previous governance model did not allow this to occur as the other shareholders took “a more conservative approach to running the business and they did influence I guess through the funding aspects of the business.”

Yet Firm A added shareholders at the early stage of the business life creating a more conservative governance model. The crisis of leadership was prolonged as,

“it all became too much for the guy who was running it he was trying to be the Chief Designer and over viewer of the juniors plus run the business plus do the billing plus chase bad debts and do everything else and he had health issues and he had to step down” (CEO of Firm A).

After some time an experienced CEO was appointed enabling the firm to move rapidly into the directional phase of growth. The differences between these two firms illustrate the extent to which the opportunity exists to examine how the phases of firm growth are influenced by dynamic capabilities. This thesis is not aspiring to address these differences, but offers opportunities for further research.

In order to understand how dynamic capabilities influence firm growth the phases of growth theory does assist in identifying what processes associated with a key management skill contribute to overcoming a crisis in growth such as what Firm E undertook. With the entrepreneur away working on projects, having incentivised and capable support pre-empted a crisis of leadership. The key feature of this crisis is the unwillingness of the founder to step aside and “allow a new manager to introduce new techniques” (Greiner, 1998 {1972}, p. 6). Firm O’s managing director illustrates this crisis of leadership when he, “stepped back for a couple of years about three years ago”, the firm recruited a CEO who eventually “didn’t kind of work out because, because of the culture of the organisation the board, the guy we put in seemed to want a very tight and explicit operating envelope in terms of what he was and what he wasn’t”. It would appear that at this stage Firm O was suffering a crisis of leadership and autonomy rolled into one due to the directional phase not being long lived.

With this observation of how a firm may remove internal limitations to growth, the use of the Greiner model will be useful to plot a firm's growth trajectory over a period of time and the periods of evolution and instances of revolution. Being able to recognise that a firm's unique processes may or may not have a "fit" with the particular phase of growth will go a long way to help understanding whether or not the process is related to a dynamic capability or not, when measured with the evolutionary fitness "yardstick" (Chapter 3). The inquiry will seek to understand a firm's internal processes and how these contributed to successful growth over time.

2.5 The role of management in firm growth.

This study is concerned with how dynamic capabilities influence firm growth. Yet as dynamic capabilities are underpinned by key management skills (Teece, 2009), the role of management would appear to play an active role in processes influencing firm strategy. For the purpose of analysing the case studies for evidence of dynamic capabilities processes at key inflection points in the firm's growth trajectory, this study will only consider a manager's influence on growth in order to identify processes implemented at a key inflection point in the firm's growth trajectory. The subject spans Coase's entrepreneur, co-ordinating firm resources as a balance to the coordinating influence of the price mechanism (1937), to the role of CEOs deliberately influencing organisational change (Greiner & Bhambri, 1989). The deliberate activities of the CEO are greatly underemphasized in recent firm growth research (Augier & Teece, 2009). Naturally, the role of the entrepreneur is considered, a term underused by Penrose in her book, *The theory of the growth of the firm* (1959). Penrose though, was clear in suggesting that the manager (entrepreneur) renders a "productive service" to the firm, enabling resources to be continuously available for expansion. Dynamic capabilities can be used "for understanding the processes of opportunity sensing and seizing as well as processes of strategic renewal" (Augier & Teece, 2009, p. 410).

Other mechanisms of sustainable firm growth require active participation by the manager (or entrepreneur). For example, vertical integration, shifting cores and divestment require the consideration of the most appropriate business design for the assets (resources) employed (Riordan & Williamson, 1985; Williamson, 2010). Thus as markets and opportunities change, underutilised resources change, requiring a response to modify the business design. Firm I encountered a potential disconnect with an overseas production plant and its core capabilities. By divesting from this production facility the firm was able to concentrate on core products in a market it was familiar with. The CEO of Firm I commented on the changes he implemented leading to the divestment of the offshore plant, "when I arrived (the plant) was still being run along the lines of this is a sunset industry

without a future despite the previous investment in [Redacted]. I arrived, I looked at it and said actually this has all the classic symptoms of something that could be managed for growth and for the future and has turned out to be so.” As per Firm I’s case study, the firm is more profitable now that productive opportunities have been realised as a result of a turnaround achieved since the new CEO arrived, four years prior (growth trajectory illustrated in Figure 2.10 above).

After falling into the trap of doing most of its work for one customer, Firm F’s managing director sees growth differently, “well at the moment it’s growing the customer base.” This recognition of utilising multiple resource linkages, technological bases and related-linked expansion to grow to reduce the risk is an intentional strategic decision. Identifying the need to grow accordingly by establishing an intended direction, the firm can progress to the next evolutionary phase of growth. The managing director attributes the change to a university course he attended where,

“you get to share things with people and business that you normally wouldn’t talk about to other people, just how your business works and what you are trying to do and you do expose yourself completely”, “it forces you to look at your numbers and understand your business, what’s driving it and just getting all the processes, I mean it’s simple, but just getting all your processes working so that you are not reinventing the wheel each time you are doing something and so part of that is getting your team working.”

The ability of the entrepreneur to learn at that period of growth is a dynamic capability and contributed to the business changing management practices to move from an entrepreneurial to a directional phase of growth. The learning and knowledge management key dynamic capabilities skill is covered in more detail in Chapter 3.

Not only are there factors which contribute to growth, there are some factors identified which inhibit firm growth. New Zealand in particular is regarded as having enhanced inhibitors to firm growth due to market size and distance from potential regional and other markets (Mills & Timmins, 2004) and possibly lack competitiveness due to the distance from key markets (Rugman, Oh, & Lim, 2012). These of course are external factors, as pointed out in a recent study, “New Zealand may well be held back by a deficit in management capability” (Green & Agarwal, 2011; MED {MBIE}, 2011b, p. ii). The study serves to highlight the need for urgent focus on internal growth limiting factors. Penrose (2009 (1959)) identified 3 “classes” of limitation to growth of a firm, namely; managerial ability, product or factor markets and, uncertainty and risk (similar to Helfat et al’s, 2007 evolutionary fitness model, see Figure 3.1, Chapter 3). The latter two classes are ones the firm has little control over. Furthermore, observations from the Hercules Powder Company study identified more specific limitations to growth, namely; finance, profitable opportunities and ability of personnel (Penrose,

1960; Penrose, 2009 (1959)). Pitelis (2002) confirms that “the conception and implementation of expansion requires managers whose firm-specific knowledge is a prerequisite for the successful planning and implementation of expansion.” (p. 3). Firm specific knowledge is an essential “capacity” required for resource base creation, extension and modification (Helfat et al, 2007). Several of the case study firms’ entrepreneurs have had experience in the energy industry globally prior to starting up their businesses. Firms A, F, H, I, K, L and N are such examples.

The creation of the productive service of the firm depends initially on the firm’s ability to learn, acquire and manage knowledge. In an entrepreneurial firm, it is necessary that an,

“increase in knowledge and an incentive to search for new knowledge are, as it were ‘built into’ the very nature of firms,” (Penrose, 2009 (1959)).

Managerial knowledge and learning capabilities and the productive service they render to the firm are central to dynamic capabilities. As the dynamic capabilities framework considers the “distinctive processes” (Teece et al, 1997) whereby the firm’s resources are repositioned in response to market change, this would appear to be a plausible framework with which to analyse their effect on firm growth.

2.6 Dynamic capabilities and firm growth.

Organisational processes are manifested as repetitive sets of actions enabling managers to achieve tasks (Bingham, Eisenhardt and Furr, 2007) and are able to be measured for effectiveness (Helfat et al, 2007). In various publications, Teece, Helfat, Eisenhardt and co-authors explicate what dynamic capabilities are, yet fall short of fully illustrating what they look like and how they may influence firm growth, particularly growth of smaller firms. Helfat et al (2007) suggested that existing research does not “tell us which dynamic capabilities, if any, contribute to growth persistence and in which firm and industry settings” (p. 113). Koryak et al (2015) also suggest that this challenge exists at present, “we know little about how a firm’s dynamic capabilities lead to the re-shaping of the venture’s substantive capabilities for growth” (p. 99). The existence of dynamic capabilities’ contribution to commercial success for large firms is adequately illustrated through examples (Feiler & Teece, 2014; Helfat & Winter, 2011; Shuen, Feiler, & Teece, 2014). It is only recently that dynamic capabilities and smaller firm performance is discussed with empirical analysis by the likes of Lichtenthaler & Muethel (2012), Schlemmer & Webb (2008) and Kuuluvainen (2012) utilising limited examples (Table 3.4). The opportunity to explore whether dynamic capabilities influence firm growth exists. Helfat et al (2007) suggests that,

“available evidence does not, however, prove a direct link between dynamic capabilities”, “in terms of growth.” Nor does it “tell us which dynamic capabilities, if any, contribute to growth persistence and in which firm and industry settings” (p.113).

In the study’s interviews the interviewee’s opinions were varied in terms of how they viewed successful growth. From the managing director of Firm M who suggested after 40 years of no persistent (sustainable) growth that he “should have improved things and built it up (Firm M) or something like that”, to the managing director of Firm E who suggested after years of sustained growth that the firm “have a great period of growth ahead.” Other firms such as Firms A, F, G, K, L and N experienced growth yet it did not appear to be sustained. This thesis aims to understand what internal factors are different in each of the case study firms. The dynamic capabilities framework offers an opportunity to understand this difference.

Growth “persistence” or sustainable growth is dependent on the intention of the firm shareholder/s (Davidsson et al, 2009; Helfat et al, 2007). During the early stages of firm growth, it is typically the entrepreneur (Greiner, 1998 {1972}) who through strategic intent or “obsession” (Hine et al, 2013) desires growth for a number of reasons including achieving sustained profits. It is also the entrepreneur who provides the key resources available to the firm in part due to its entrepreneurial orientation (McKelvie & Davidsson, 2009; Quince & Whittaker, 2003) and motivation (Shane et al, 2003). As the firm grows it is the co-ordination of these resources that is a requirement for sustainable growth (Greiner, 1998 {1972}). Sustainable growth requires investment in innovation (Schumpeter, 1947) which in turn requires profits. Profitable growth is therefore a necessity for sustainable growth (Davidsson et al, 2009).

What the dynamic capabilities framework addresses is how a firm maintains the vigilance, aptitude and ability to “re-organise” continuously in a continuously changing environment. In an increasingly dynamic and globalised world where exchange rates, global events, monopolistic behaviours for example are outside any one firm’s control, it is timeous that the dynamic capabilities framework is considered as a strategic option. Stemming from the design and learning strategy schools (Mintzberg & Lampel, 1999), the dynamic capabilities framework is possibly one to consider when analysing the internal challenges a firm faces as it evolves.

Key management skills underpin how the firm is able to create, deploy and reconfigure resources. These skills are dependent on a firm’s unique dynamic capabilities processes; “the competitive advantage of firms lies with its managerial and organisational processes,” (Teece et al, 1997, p.519). Finding a way to analyse a firm’s growth through its internal capacity to sense and seize opportunities, reconfigure key resources and renew them is through analysing processes related to

key management skills. This thesis aims to firstly develop an operational mechanism with which to analyse a firm's internal processes for evolutionary fitness in order to identify dynamic capabilities at particular inflection points. Before that is possible though, the processes associated with dynamic capabilities need to be expanded upon. Chapter 3 explores what dynamic capabilities are, how to identify and measure them.

Chapter 3: Dynamic capabilities.

3.1 Introduction.

When Teece et al suggest that a firm's strategic advantage resides in a firm's management processes (1997), they are referring to the resulting actions of the "managers/entrepreneurs" in response to changing economic environments. A response of change in the "competitive position of the firm" to these changes include the appropriate "administrative co-ordination" (Penrose, 2009 (1959), p. 180). Change in the New Zealand and wider regional market have an influence on the opportunities for, and threats to, growth of firms operating within it (discussed in Chapter 2.2). Some firms such as Firm F and K have experienced increases and declines in growth due to the opportunities and threats presented by the New Zealand energy industry. Yet firms such as Firms B, E, H and P grew despite the downturn in the industry. Firm N exhibited growth despite an industry downturn for a period of time but this growth was not sustained. The managing director of Firm B recognises that even though there are few market opportunities "you can still make money." An opportunity exists to use the dynamic capabilities framework with which to analyse management processes underlying the performance differences between firms operating in the same industry.

Strategic change in organisations as they adapt and grow is a "process of making important organisational decisions," (Mintzberg, 1967, p. 71) undertaken by the "strategy-maker", "entrepreneur" or "manager". The importance of these decisions relies upon the skills of the "manager." Again, the managing director of Firm B recognises the importance of the role of the "strategy maker":

"I noticed that it's really just about your capacity to make money off a given solution, like regionally or otherwise doesn't really matter. You could make a million dollars in Auckland doing something which people need and they could pay you a million bucks for it or you could make a million bucks chasing work in Australia if that's what you want to do. It depends on you as a business person I think on how you focus and what your particular solution is."

Strategic change is "possible if the CEO possesses the requisite skills to match evolving situational needs" (Greiner & Bhambri, 1989, p. 84). Strategy making in an evolving environment requires a more multi-faceted blueprint for success as Greiner & Bhambri (1989) suggest: "future academic research may be able to increase the probability for new CEO success if it deepens our understanding of the internal dynamics of deliberate strategic change" (p. 84). The dynamic capabilities framework is a response to this suggestion as a means to understand what successful deliberate change is, within the context of the New Zealand energy industry. Chapter 4 describes how the rapidly changing

economic environment affects New Zealand engineering firms operating in the energy industry. All the case study firms (including the large Firm C) do not have any control over their economic environment.

One of the challenges faced with attempting to use dynamic capabilities to examine firm growth, is identifying what they look like at a practical level; “the available evidence does not”, “tell us which dynamic capabilities, if any, contribute to growth persistence and in which firm and industry settings” (Helfat et al, 2007, p. 113). Initially a prerequisite to a firm exhibiting dynamic capabilities was a constantly changing environment (Teece et al, 1997), suggesting dynamic capabilities are a limited option when it comes to strategy. Since the origins of the dynamic capabilities framework (Teece & Pisano, 1994; Teece, Pisano & Shuen, 1997) much has changed in the global economic environment. In an increasingly globalised world, global factors, such as indicated by the oil price in this thesis (Figure 2.1) constantly change. It would be reasonable to suggest then that dynamic capabilities are applicable to SMEs operating in the New Zealand energy industry increasingly subject to these changes. Chapters 2 and 4 illustrate this relationship. Chapter 6 describes this external influence on several of the case study firm growth in more detail.

The challenge firstly is to answer the question of what the relatively new construct of dynamic capabilities are. Dynamic capabilities also need to be understood prior to analysing their effect (if any) on the performance of the firm. This chapter offers a path towards “operationalising” dynamic capabilities. Fortunately there is enough guidance from Teece and others describing what dynamic capabilities are. Helfat et al (2007) describe how to measure them. Yet, the question remains whether there is a relationship between dynamic capabilities and growth (Augier & Teece, 2009; Helfat et al, 2007; Koryak et al, 2015; Peteraf, Di Stefano, & Verona, 2013). Figure 5.1 (Chapter 5) illustrates the research gap of finding a relationship between dynamic capabilities and growth.

There are several definitions of dynamic capabilities (Helfat et al, 2007; Teece & Pisano, 1994; Teece et al, 1997; Winter, 2003). They include: “dynamic capabilities are the subset of competencies / capabilities that allow the firm to create new products and processes, and respond to changing market circumstances” (Teece & Pisano, 1994, p. 541); “dynamic capabilities”, are “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al, 1997 p. 516); “a dynamic capability is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness” (Zollo & Winter, 2002, p. 340); “the capacity of an organisation to purposefully create, extend, or modify its resource base” (Helfat et al, 2007, p. 4) and latterly;

“the ability to sense and then seize new opportunities, and to reconfigure and protect knowledge assets, competencies, and complementary assets with the aim of achieving a sustained competitive advantage” (Augier & Teece, 2009, p. 412).

In summary, dynamic capabilities are the ability of the firm to sense opportunities, seize them and transform / reconfigure resources which provide the firm with a strategic advantage. In a constantly changing environment, dynamic capabilities' processes themselves become redundant (Helfat & Peteraf, 2003) and therefore insight is required into the renewal thereof. To seek out dynamic capabilities processes in the firm at a practical level, the key dynamic capabilities management skills (Teece, 2009) are suggested as a mechanism to identify the key dynamic capabilities processes. The five key management skills are explicated. The purpose of which is to be able to identify these unique “higher order” processes that meet the requirement of contributing to a firm’s “evolutionary fitness.” There is however the question Peteraf et al (2013) raise about the structural or underlying differences between two dynamic capabilities schools of thought. The EM (Eisenhardt & Martin, 2000) and TPS (Teece et al, 1997) views differ in the origins of dynamic capabilities boundary conditions and sustainable and competitive advantages. Peteraf et al (2013) conclude that the differences in dynamic capabilities views are due to “perspectives”. This research is not considering the dynamic capabilities' perspective, it is only concerned with “looking for higher order dynamic capabilities” (p. 1407). The purpose of this study is to understand whether dynamic capabilities have an influence on firm growth at an operational level and hence is not considering the argument surrounding the difference in the origins of dynamic capabilities. Peteraf et al admit that “dynamic capabilities have the potential to explain sustainable competitive advantage in rapidly changing environments” (p. 1392). They also suggest that these views “both focus on the role of organisational routines, both concern managerial as well as organisational processes, and both portray the dynamic capabilities framework as an extension of the resource based view” (p. 1392).

This research focuses on processes in order to analyse whether dynamic capabilities have an effect on firm growth. There is a common “treatment” in dynamic capabilities literature; that they are reliant on organisational routines, processes and that dynamic capabilities in turn are reliant on a resource based view of the firm (Easterby-Smith et al, 2009; Peteraf et al, 2013). As Penrosean firm growth is reliant on the actions (or processes) of the firm to grow, maintaining a process view of dynamic capabilities should remove any doubt the argument Peteraf et al (2013) make between the Teeceian and Eisenhardt view of dynamic capabilities.

Yet whilst the dynamic capabilities framework is comprehensively explicated, it lacks the empirical analysis to concretise it in an operational environment. As Teece (2009) suggests,

“the future relevance of competencies and capabilities within strategic management will depend on whether developments in the field will bring us closer to an empirically relevant paradigm” (p.108).

This chapter explains what dynamic capabilities are, how to identify them, what their renewal looks like and how to measure them. Research questions are posed once sensing, seizing, transforming dynamic capabilities and their renewal is explained. In Chapter 5 the key dynamic capabilities processes are coded to enable them to be qualitatively allocated at the inflection point along the firms’ growth curve where they were implemented.

3.2 Dynamic Capabilities: What are they?

Eisenhardt and Martin (2000) appropriately asked “Dynamic Capabilities: What are they?” Research on dynamic capabilities thus far considers aspects of firm performance yet no single study addresses what dynamic capabilities look like in relation to firm growth over time. In attempting to answer the question of how dynamic capabilities influence firm growth it is imperative to understand what dynamic capabilities are in order to identify them.

Amongst the many strategic competitive advantage concepts such as: strategic conflict leading to efficiency methods (Schumpeter, 1947); competitive forces (Porter, 1980); resource based view (Barney, 1991); the more recent dynamic capabilities framework (Augier & Teece, 2007; Helfat et al, 2007; Teece et al, 1997; Teece, 2009; Winter, 2003) offers an explanation of how a firm grows sustainably over time despite the changes in the firm’s economic environment. In an ever changing market where local firms find themselves competing globally, management have the opportunity to look at internal productive opportunities rather than to the marketplace for growth (Augier & Teece, 2009; Schlemmer & Webb, 2008). Dynamic capabilities are a relatively new way to look at how a firm sees opportunities and achieves long term advantage. It is not only the presence of a resource base, but how opportunities are sensed and seized, and resources re-configured which contribute to any particular sustainable growth mechanism in the face of a changing environment (Helfat et al, 2007; Teece & Pisano, 1994; Teece, 2009).

Yet criticisms of the dynamic capabilities framework suggest they are difficult to identify (Eisenhardt & Martin, 2000), are not well understood (Kuuluvainen, 2012; Winter, 2003) and vague (Kraatz & Zajac, 2001). Helfat et al (2007) and Bingham et al (2007) build on Teece’s explications on the type of processes dynamic capabilities consist of, to establish a list of processes related to the sensing, seizing and transforming dynamic capabilities (summarised in Tables 3.1, 3.2 and 3.3).

This research is aimed at developing a greater understanding of dynamic capabilities as “much remains to be learned about the underlying mechanisms, processes and intermediate outcomes

associated with dynamic capabilities” (Easterby-Smith et al, 2009, p. S3). To answer the question of how dynamic capabilities influence firm growth, the processes related to dynamic capabilities at inflection points along a firm’s growth trajectory (Narayanan, Colwell, & Douglas, 2009) need to be investigated. For this to happen, a mechanism with which to operationalise these processes at the firm’s growth inflection is required. Chapter 5 details the development of this mechanism to identify, understand and make clear dynamic capabilities’ influence on firm growth.

It could be argued that engineering firms operating in the New Zealand energy industry are subject to a “fast moving business environment open to global competition” (Teece, 2009, p. 4) as Figure 2.3 illustrates. This should satisfy the “Teeceian” pre-requisite for a firm to exhibit the hard to replicate firm specific processes associated with dynamic capabilities. There is evidence in the New Zealand energy industry that proprietary advantages are quickly eroded through such external effects such as “free ridership” (Perrons, 2014). The CEO of Firm C is wary of this aspect of erosion of a competitive advantage and;

“in some of the technology spaces we will be pretty cautious about how much we will share because in the New Zealand context why would we want to give away our IP and essentially facilitate competitors into the market when we have invested all the time and effort into it.”

He further explains that,

“a problem that permeates in infrastructure and technology engineering businesses which is what I call the brotherhood of engineering or the brotherhood of blood economists where they seem to have this propensity to discuss all the in-house secrets and IP just because they kind of almost hold the discipline which they are employed in above the organisation.”

This erosion of strategic advantage as described by the CEO of Firm C has the effect of changing the energy industry’s competitive environment to which the firm operating within it must respond to grow sustainably. A successful response must rely on internal resources bringing with them unique capabilities and hence the dynamic capabilities framework is recommended as a useful framework with which to “perceive, explain and predict” factors of firm performance.

It is not possible to understand what a firm’s capacities and hence capabilities are without understanding what its resources are (Barney, 1991). Whilst Barney’s resource based view of the firm is a useful construct to understand how resources contribute to a firm’s unique capabilities, it does not explain how these resources contribute to a firm’s sustained growth. This static understanding of how a firm’s resources contribute to a firm’s growth needs to be extended to a dynamic paradigm. This paradigm is one of “disequilibrium, learning, experimentation and change” (Foss, 1999, p. 101).

A firm is more than just an administrative organisation; it is a collection of “productive resources” which give the firm capacity for growth (Penrose, 2009 (1959)). Penrose suggests that growth opportunities originate from a firm’s unused resources, the opportunity for growth. Resources are central to how a firm derives a profit. Only those resources that are scarce, difficult to imitate and contribute to a profitable enterprise (Teece, 1984; Teece, 2009) are consistent with dynamic capabilities. Profits are a pre-requisite to sustained growth (Davidsson et al, 2009). Resources are tangible (plant, raw materials) and intangible (entrepreneurial, process, human, skills, financial) and derived from within and without the firm (Penrose, 1960). This above market average “value” as perceived by customers or markets can help identify what an appropriately co-ordinated resource is (Mills, Platts, & Bourne, 2003).

For example, the managing director of Firm F commented that when his firm intentionally developed a specialist machine in 2006 for the industry through imitating and modifying much larger and expensive machines the firm “got jobs (which) are not high value, but it’s the stuff that goes with it, you know.” This SME’s entrepreneurial orientation (Hughes & Morgan, 2007) enabled the sensing of the market opportunity, seizing of this opportunity by designing and building the machine and in the process transformed a resource; the unique and inimitable skills that accompany this innovation.

What the example above illustrates is that whilst Firm F exhibits the dynamic capabilities of sensing, seizing and transforming, it is the expansion of the “productive opportunity” through a set of inimitable internal heuristics, value creating strategies (Bingham & Eisenhardt, 2011), that deliver value from the firm’s resources. It is the co-ordination of these resources that is as critical as the resources themselves. The creation of further resources by the entrepreneur expands the ability of the firm to grow, but the creation of resources within an administrative framework cannot be judged successful unless it contributes towards a more profitable activity (Penrose, 2009 (1959)) such as sales growth (Uhlener, van Stel, Duplat, & Zhou, 2013).

As the comment above from the managing director of firm F suggests, this innovation process allowed the firm to establish market value with the net result in earning further returns for the firm. The dynamic capabilities framework explains how a firm can reconfigure resources as a response to environmental opportunities by sensing and seizing opportunities and transforming resources.

This approach involves exploiting internal strengths, avoiding internal weaknesses, neutralising external threats and responding to external opportunities. Where resources are constrained, a deliberate level of entrepreneurship is required to optimise resource use (Garnsey, 2002; Loasby, 2010; Zollo & Winter, 2002). The resource’s contribution and resultant capability is manifested in a firm’s unique processes (Bingham & Eisenhardt, 2011; Bingham et al, 2007). Where limited resources

exist, particularly in an SME, the importance of effective processes (and rules – heuristics) is heightened. In SMEs this is often the case when the entrepreneur provides these resources. It is not the entrepreneur per se, but the unique set of abilities they render that provide a competitive advantage (Whittaker, 2009). Dynamic capabilities fall into the design and learning schools of strategic processes (Mintzberg & Lampel, 1999) where an understanding of the firm's strategic fit and its learning processes guide the understanding how they may be measured for effectiveness in contribution to growth.

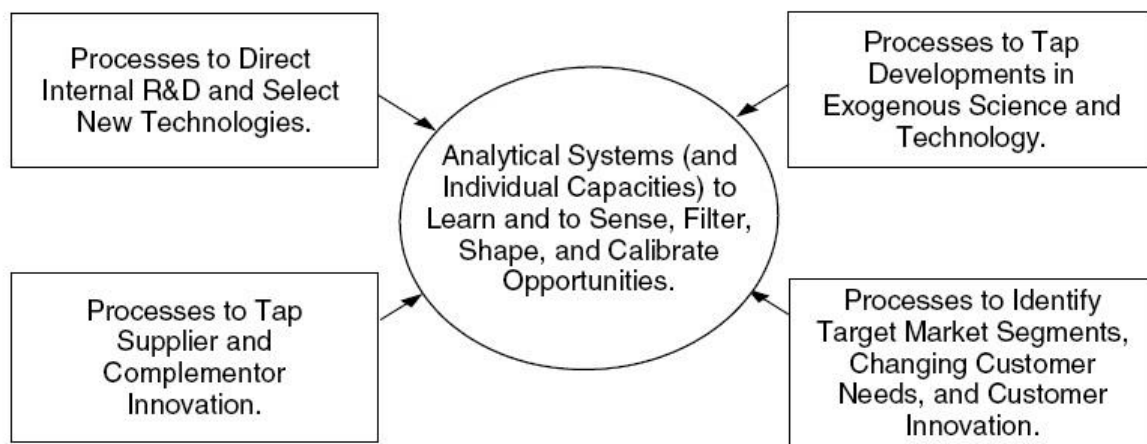
The ability to adapt a firm to the constantly changing environment begins with the ability to sense the opportunities or threats associated with this change. Sensing capabilities are important in strategic management as “concepts such as adaptation, coordination, management, etc. become intimately associated with learning” (Foss, 1999, p. 99).

3.2.1 Sensing capabilities.

Underlying a firm's capability to innovate is the capability of searching for and understanding endogenous and exogenous opportunities. Endogenous opportunities for sustained growth, for example could be finding the most appropriate “strategic fit” of the organisational business model to its current market (Agarwal & Helfat, 2009; Ambrosini et al, 2009; Augier & Teece, 2009; Helfat et al, 2007). Firm B sensed that market opportunities were not being realised due to the ownership structure limiting risk taking. The managing director approached and bought out his fellow shareholders and was able to pursue more profitable market opportunities. The ability to see this limitation to growth is a sensing capability derived from an entrepreneurially oriented (Hughes & Morgan, 2007; Quince & Whittaker, 2003) resource, in this case the entrepreneur.

Sensing in a more traditional sense includes research and development (R&D). For processes associated with R&D for example to meet the dynamic capabilities threshold, they need to be intentional and not “ad hoc” (Helfat et al, 2007). Conveniently, the processes associated with sensing capabilities are illustrated by Teece (2009, 2007) in Figure 3.1.

Figure 3.1 – Summary of the elements of sensing capabilities indicating key processes (Teece, 2009, p. 17).



Learning and knowledge management play an integral role in the sensing capability of a firm; “sensing new opportunities is very much a scanning, creation, learning and interpretive activity” (Teece, 2009, p. 9). Experience, part of the entrepreneurial learning process (Figure 3.9), is very important for the efficacy of sensing processes (Deakins & Wyper, 2010; Lecler & Kinghorn, 2014). In order to address the challenge of what sensing capabilities look like in a firm, the processes illustrated in Figure 3.1 above are summarised in Table 3.1. This table forms the basis for the coding required to analyse each firm case study. This is expanded upon in Chapter 5.

Table 3.1 – Summary of sensing capabilities processes (foundations) and supporting elements (Teece, 2007; Teece, 2009).

Sensing Capabilities Foundations	Sensing Capabilities Micro-foundations	Elements
Analytical systems (and individual capabilities) to learn and to sense, filter, shape, and calibrate opportunities	Processes to direct internal R&D and select new technologies	Allocates resources to creative processes Undertakes learning activities externally Seeks information about what’s going on in the business ecosystem Undertakes internal and external search/exploration activities for new products and processes
	Processes to acquire supplier and complementor innovation	Searches for collaborators, customers, suppliers, and complementors (potential JVs) that actively innovate
	Processes to tap developments in exogenous science and technology	Scans and monitors new external technological developments Seeks out linkages with universities and other research institutions
	Processes to identify target market segments, changing customer needs and customer innovation	Monitors and assesses customer needs and competitive activity Processes to shape new products and processes Top management team evaluates/assesses information from junior staff Uses decentralised decision-making

The query of whether dynamic capabilities influence firm growth starts with the sensing capabilities. Therefore the first research question is posed:

Research Question 1: How do sensing capabilities influence firm growth?

3.2.2 Seizing capabilities.

Once an opportunity is sensed, the intentional, strategic action using this knowledge or learning is termed “seizing” (Teece, 2009) by “extending” a resource base (Helfat et al, 2007) or “integrating” (Teece et al, 1997) for example the resource with complementary resources. Seizing refers to how the firm resources are strategically (intentionally) “fitted” to the firm’s resources to take advantage of the market (or internal) opportunity. As with the sensing capabilities, seizing capabilities are supported by a set of intentionally effected processes. In Firm I’s case, once the CEO had understood that the business was “still being run along the lines of this is a sunset industry without a future”, yet “there all the classic symptoms of something that could be managed for growth”, he set about seizing

an internal opportunity. From 2011 the CEO began implementing productivity enhancements such as automation such that the firm gets,

“around 4 or 5% in continuous improvement and efficiency gains this year, in one year. So business processes that are around forever, for decades and we think we can grind out fours and fives a year, each year.”

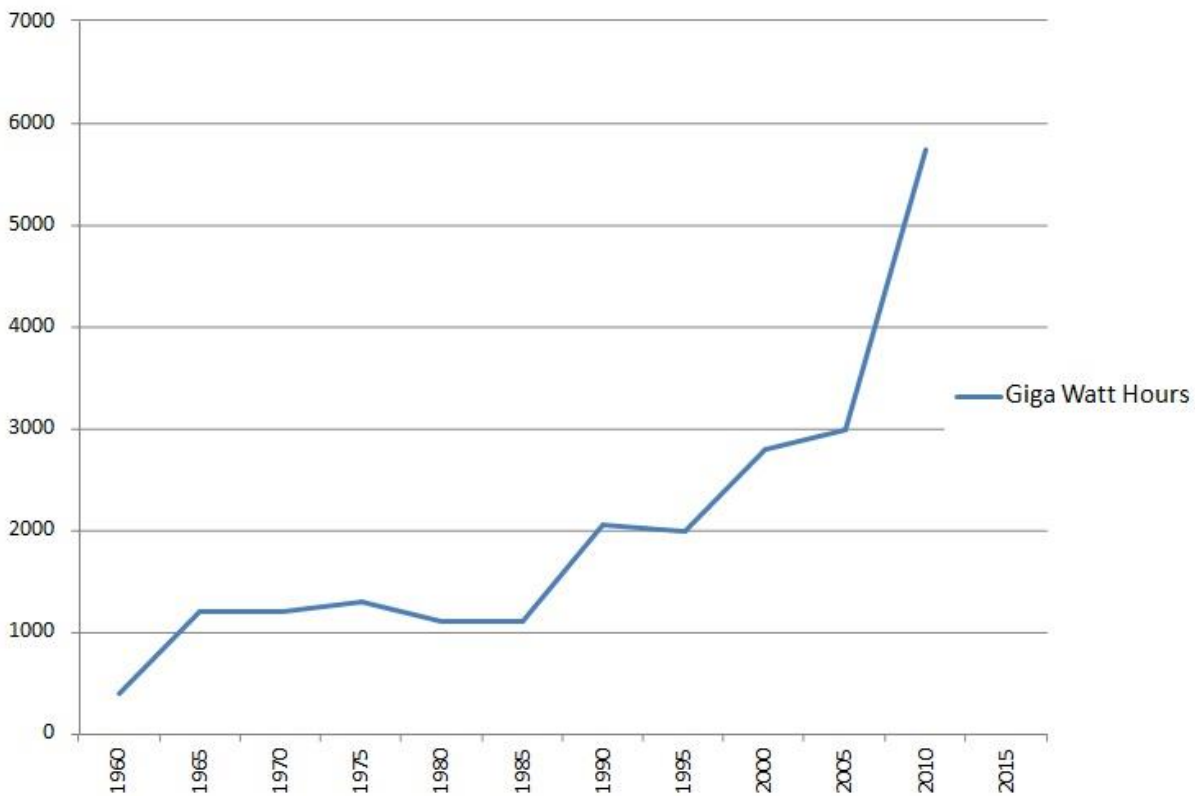
This activity satisfies the dynamic capabilities requirement of being intentional and “evolutionary fit” (Augier & Teece, 2009; Helfat et al, 2007) – discussed in further detail in Chapters 5, 6 and 7.

Seizing capabilities require resources. In particular, “investments in development and commercialisation activity” (Teece, 2009, p. 17). The example of Firm I above illustrates this investment in development, not only physical, but also behavioural and cultural as the CEO of Firm I attests;

“this journey (of productivity improvement) has been about pride and respect and also having a damn good story to tell about manufacturing renewal or manufacture turnaround in NZ. So for people who are more confident in looking externally, there’s a pretty big financial component.”

Each case study examines the inflection point along the firm’s growth trajectory where a new seizing capability is exhibited. In the case of Firm I, in 2011, investment was made in internal automation and cultural improvements to improve the profitability of the firm. Despite Firm I appearing to be a staid firm in a dynamic industry, see Figure 3.2, the improvements to physical and non physical factors improved firm performance as the market presented a growth opportunity. The CEO implemented this improvement through the intentional application of resources, which is consistent with the conclusion Mills et al (2003) reach in their paper on the positive outcome when key resources are positively utilised by intentional managerial actions in a manufacturing firm. This focus on productivity through investing in technology resulted in Firm I exploiting the opportunity to become more profitable in favourable market conditions (Grünbaum & Stenger, 2013; Koryak et al, 2015).

Figure 3.2 – New Zealand cumulative giga watt hour (GWH) capacity (www.nzgeothermal.org.nz).



Teece (2009, 2007) illustrates the processes underpinning the seizing capabilities (Figure 3.3) and these are summarised in Table 3.2. These processes are applied a priori as a tool to examine whether a firm's processes meet the dynamic capabilities threshold. It is worth noting that when examining the firm's processes for evidence of dynamic capabilities that the processes are of a certain "quality", in other words, "fully embraced" in order to remove any of the biases well established processes present to a firm (Teece, 2009). The seizing processes must fit the firm's strategy and care must be taken that an apparent seizing process is not path dependent on past or present "valid" processes which ultimately become "core rigidities" (Bingham & Eisenhardt, 2011; Bingham et al, 2007; Leonard-Barton, 1992). Thus, the case for understanding what role renewal processes of dynamic capabilities play in the growth of the firm is strong. This is discussed in more detail in 3.2.4.

Figure 3.3 – Summary of the elements of seizing capabilities indicating key processes (Teece, 2009, p. 35).

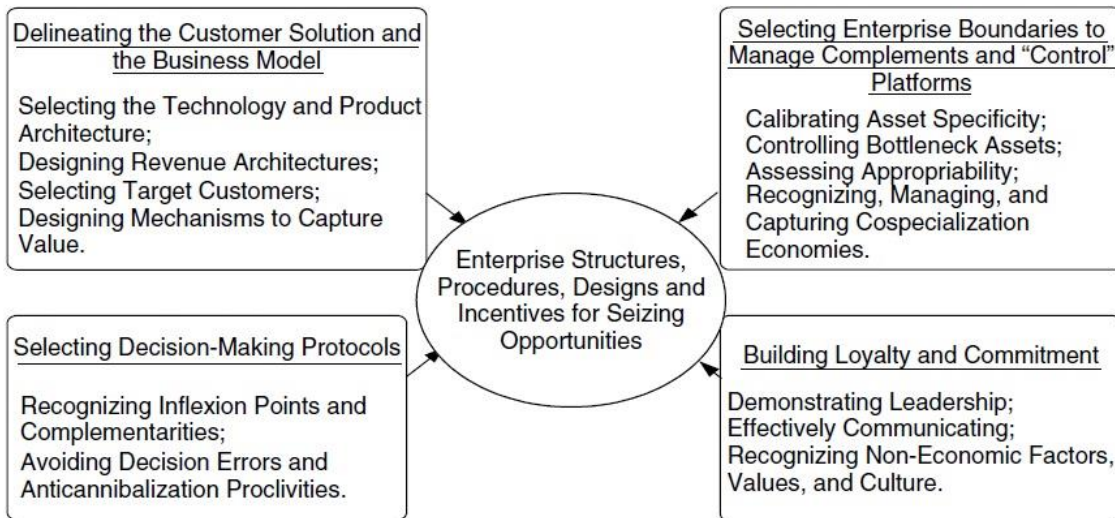


Table 3.2 – Summary of seizing capabilities’ processes (foundations) and supporting elements (Teece, 2007; Teece, 2009).

Seizing Capabilities Foundations	Seizing Capabilities Micro-foundations	Elements
Enterprise structures, procedures, designs, and incentives for seizing opportunities	Delineating the customer solution and the business model	<p>Regularly creates, refines, and replaces business models</p> <p>Obtains and uses evidence to validate assumptions about costs, customers, competitors, complementors, distributors, and suppliers</p> <p>Analyses alternative business models</p> <p>Has a deep understanding of customer and consumer needs</p> <p>Analyses the value chain to understand how to deliver what customers want, in a cost-effective and timely manner</p> <p>Adopts a neutral perspective to outsourcing decisions</p> <p>Undertakes market and transactions cost economies research</p> <p>Introduces new products, processes, or services</p> <p>Improves technological competencies and complementary assets</p> <p>Plans revenue and cost architecture</p> <p>Actively targets key customers</p> <p>Designs business model and pricing strategy to enhance and capture value</p>
	Selecting decision-making protocols	<p>Recognises a turning point - an event that dramatically changes the way of thinking and acting</p> <p>Uses decision-making processes</p> <p>Uses decentralised decision-making style</p> <p>Uses procedures to overcome decision-making biases and errors</p> <p>Employs outsiders to review external information (e.g. consultancy reports)</p> <p>Allows management to offer honest opinions and look at historical data to test for errors in logic</p> <p>Maintains procedures to reward creative action</p> <p>Maintains procedure to shed unproductive assets and processes</p> <p>Considers opportunity-cost when making investment decisions</p> <p>Uses capital-budgeting procedures to guide investment decisions</p>
	Selecting enterprise boundaries to manage complements and "control" platforms	<p>Reviews whether assets are fit for purpose</p> <p>Controls bottlenecks in the value chain</p> <p>Has natural and legal protection for innovation</p> <p>Understands relative positioning of own innovation and potential imitators in respect to complementary assets</p> <p>Understands phase of industry development</p> <p>The degree of upstream and downstream integration</p> <p>Undertakes collaborative activities</p> <p>Uses outsourcing to capture scale-based processing from contract manufacturers</p> <p>Uses complementary products provided by others</p>
	Building loyalty and commitment	<p>Instils organisational identification and commitment</p> <p>Communicates goals, values, and expectations</p> <p>Reinforces values and entrepreneurial culture</p>

Seizing capabilities processes are undertaken with existing assets and routines (resources). It may be possible to continue to grow by seizing other opportunities with the same resources. Firm G was able to do this by diversifying its service from 2009 as the general manager commented, “we’re doing lots of manholes but then we sort of brought that in-house, would hire in just a drain layer but we have all the equipment.” The firm continued to grow as Figure 2.9 illustrated earlier, however, “that cost was starting to reel out of hand” leading to, “less supervision, the productivity was not as good as what it could have been, staffing issues, it just got out of hand.” Firm G’s example illustrates the capability of growth through market and technological linkages by seizing the opportunity with existing resources. It is somewhat surprising then as Figure 2.9 suggests growth was ultimately not sustained. Profitability suffered through added costs as the general manager suggests and without profitability, sustained growth is not possible (Davidsson et al, 2009). In order to answer the question of whether dynamic capabilities influence firm growth, the second research question is posed:

Research Question 2: How do seizing capabilities influence firm growth?

Firm G had to undertake deeper changes as its existing customer base, “now want different fittings and things like that. That’s more at tender stage that we notice they are changing or word of mouth. Some of the guys are in talking to the project managers and they say ‘hey look for this job we’ve got a new system’”, illustrating a changing business environment. Firm G needed to do more than just seize related opportunities. With an asset heavy business and a changing marketplace, Firm G found itself laden with debt, high costs and few “valid” processes. Yet when the firm’s economic environment changes to the extent that these assets and routines are no longer valid, something fundamental in the firm had to change, or transform.

3.2.3 Transformational capabilities.

Sensing and seizing capabilities provide the firm with the correct knowledge of, and necessary action, to ensure that the firm has a “strategic fit” between its key resources and market. “Fitting” the firm’s resources to the market is possibly through the sensing and seizing capabilities alone, yet what happens when the resources required are no longer a “fit” with a firm’s market? As the firm cannot presume “that economic activity is best organised by markets” (Teece, 1984, p. 100), the firm’s response to market changes (including technological) must be transformational. The changing economic environment presents either a challenge or an opportunity depending on how the competing firm responds. The range of responses could be from doing nothing (as Firm M’s case study illustrates) to developing a culture of changing the firm “DNA” as Firm E’s case study suggests.

The mechanism of growth when the firm is faced with market threats could lead to internal changes or “shifting cores” (Kay, 2002), thence projecting the firm towards a better “fit” with its market.

Firm K realised in 2010 that once the New Zealand market for geothermal engineering expertise was diminishing, the firm actively invested in and sought out opportunities regionally and beyond. The offshore marketing skills resource was vastly different to what the firm previously possessed. The managing director of Firm K commented that the firm invested in “marketing in Asia for four years” and are now “internationally known through Asia, through the Philippines, Indonesia and Kenya for our expertise.”

Firm K did not have the resources to market to large power companies in order to begin to diversify its service offering. Yet as the “geothermal community is relatively small internationally”, the managing director attributed recent international work to his established network and reputation internationally (Davidsson & Honig, 2003; Granovetter, 2005). Being able to assess the next income stream through growing a geographic customer base with an existing set of engineering skills required skills in international business. Firm K redesigned its business structure to accommodate this requirement; a globally experienced business development manager was brought on board. As Teece suggests, “a business model is a plan for the organisational and financial ‘architecture’ of a business,” (2009, p. 24) suggesting that Firm K intentionally changed the mechanism to capture value through a change in business structure. This capacity to intentionally change the business structure is “foundational to dynamic capabilities” (Teece, 2009, p. 25). This example serves to illustrate that the ability to “see” where and when market changes are eventuating, and the ability to make changes to realise immediate market opportunities is the ability to change the internal structure of the firm allowing it to continue to be profitable. This ability to intentionally change one of the foundations of the firm’s success is typical of a reconfiguring or transforming capability. Figure 3.4 illustrates key processes associated with transforming capabilities, the elements of that are summarised in Table 3.3. In order to answer the question of whether dynamic capabilities influence firm growth, the third research question is posed:

Research Question 3: How do transformational capabilities influence firm growth?

Figure 3.4 – Summary of the elements of combination, reconfiguration and asset protection skills (Teece, 2009, p. 45).

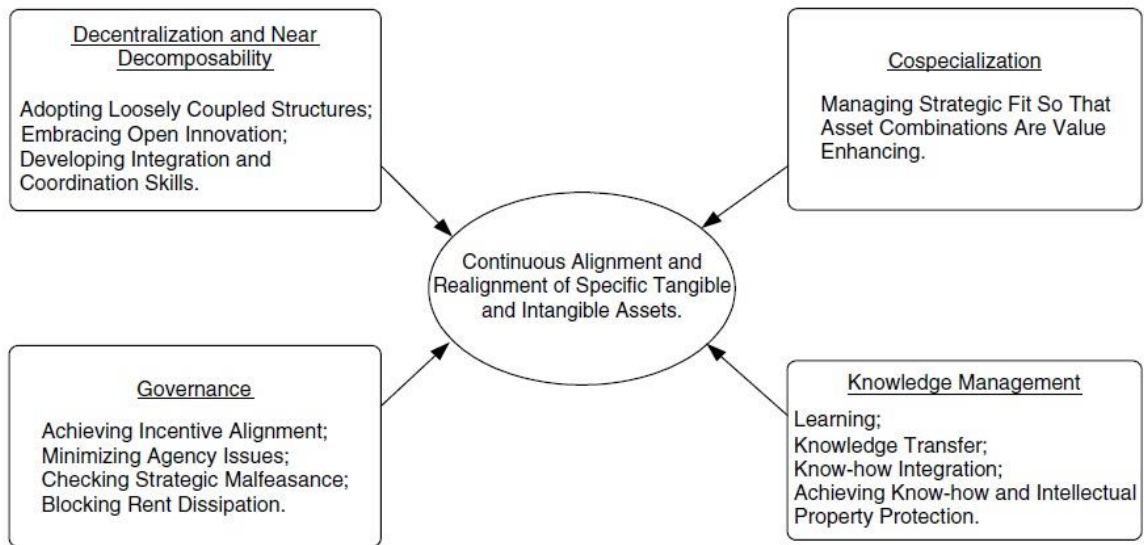


Table 3.3 – Summary of transformational capabilities’ processes (foundations) and supporting elements (Teece, 2007; Teece, 2009).

Transforming Capabilities foundations	Micro-foundations	Elements
Continuous alignment and realignment of specific tangible and intangible assets	Decentralization and near decomposability	Uses different managers to observe different information and influence decisions Uses internal and external integrated collaborative non-hierarchical management forums Uses decentralised organisational structures Makes co-ordinated decisions quickly
	Governance	Uses incentive scheme for top management team and junior staff Minimises agency issues Uses procedures for replacement and renewal of board members and the top management team (and succession planning) Procedures to prevent the abuse of discretion and use of business assets for personal use
	Cospecialization	Aligns assets - strategy to structure, strategy to processes and resources Combines a co-specialised asset with another asset to enhance value Coordinates R&D and alliance activity Shares investment to create shared technologies and processes
	Knowledge management	Uses R&D to promote learning Collaborates with other organisations and universities to share and combine knowledge Facilitates the sharing of knowledge - internally Integrates external know-how Proactively monitors and manages the misuse of knowledge

3.2.4 Renewal of dynamic capabilities.

The dynamic capabilities framework provides an opportunity to understand how a firm maintains its “enterprise-level competitive advantage over time,” (Teece, 2009, p. 5). Therefore, as the firm’s marketplace changes over time, previous factors of success become less relevant. If the firm wishes to grow further, the way it captures market value needs to change (Cameron & Whetten, 1983), sometimes easier for smaller firms to do due to their lower operating costs (Penrose, 2009 (1959)).

The market renders a firm's competitive advantage, derived from unique capabilities, less relevant over time unless renewed (Ambrosini et al, 2009; Helfat & Peteraf, 2003). The specific firm capabilities providing this advantage face the dilemma of "infinite regress" (Collis, 1994), where the capabilities' efficacy diminishes in the face of ever changing markets. The analogy of the product lifecycle (Kotler, 1965; Stark, 2011) provides a basis for understanding dynamic capabilities lifecycles. Renewal, or "refreshing" (Agarwal & Helfat, 2009; Helfat & Peteraf, 2003; Teece et al, 1997) of capabilities in this context refers to the strategic (intentional) changing of the firm's key resources (and heuristics) to reflect a better "strategic fit". Renewal involves a firm's ability to sense "environmental changes and being able to link them to strategy and to modify the relationship over time" (Lecler & Kinghorn, 2014, p. 67). Strategic renewal is defined as, *"the process, content, and outcome of refreshment or replacement of attributes of an organisation that have the potential to substantially affect its long-term prospects"*(Agarwal & Helfat, 2009, p. 282).

What the dynamic capabilities framework fails to explicate is how the dynamic capabilities themselves need renewal. As the "capacity to reconfigure and transform is itself is a learned organisational skill" (Teece & Pisano, 1994, p. 545), a firm that strategically renews itself would demonstrate these organisational skills. In a constantly changing marketplace with high "velocity" (Hine et al, 2013) of change, such as the energy industry (Figure 2.1 and 2.2) certain firm resources become increasingly redundant over time (Agarwal & Helfat, 2009; Rugman & Verbeke, 2002). The case of Firm E illustrates the capacity to reconfigure resources through learning, business design and asset orchestration skills, not only once, but three times along its growth trajectory (Chapter 6.4). Firm I's Australian operation ceased to be a productive asset as the focus moved to utilities and geothermal energy in New Zealand as the CEO commented the industry has undergone a *"consolidation of the domestic manufacturer base in NZ and in Australia and in exchange you have the gradual increase in imported product and that's happened very quickly."*

As dynamic capabilities are the ability of the firm to strategically sense and seize firm opportunities and reconfigure these resources, then it stands to reason as these reconfigured resources become redundant, the processes behind the capabilities of this reconfiguration need themselves renewing. In Firm I's case, the processes under previous management changed when the new CEO was brought on board. Firm I's board possessed sensing and seizing capabilities which enabled the firm to recognise that it needed to change, hire the right CEO to implement these changes (Augier & Teece, 2009; Schlemmer & Webb, 2008) and effect the resource transformations to establish a more profitable trajectory.

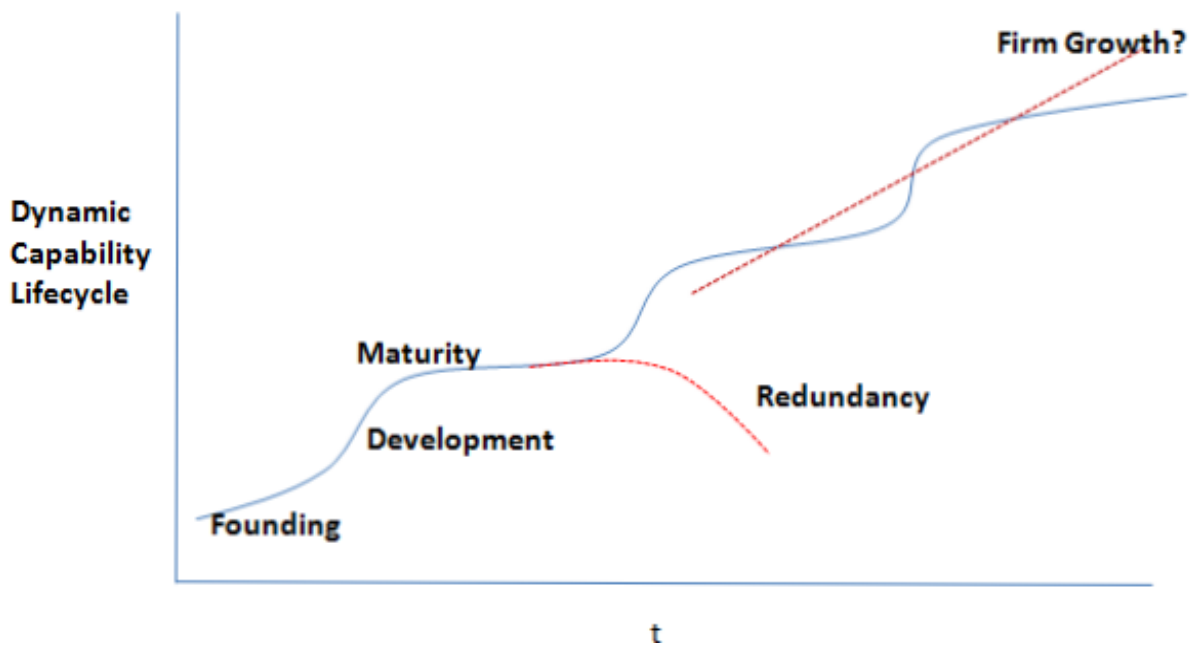
As the objective of this study is to understand how a firm might ensure “economic success over time” then the “gap in our understanding makes it more difficult to offer prescriptive advice to managers”, the capability lifecycle framework “helps to explain the fundamental sources of firm heterogeneity” (Helfat & Peteraf, 2003, p. 997). Furthermore, Teece et al (1997) suggest that the firm’s *“particular set of routines can lose their value if they support a competence which no longer matters in the marketplace, or if they can be readily replicated or emulated by competitors”* (p. 524).

This turns out to be the case for Firm E, as the diminishing importance of its key skill resource was identified in 2000 as a weakness, to which the managing director responded by transforming the ownership and hence governance model of the firm. The process of evaluating the “strategic fit” of the firm governance, business model and assets with its changing marketplace is identified as a dynamic capabilities process. This is described further in Firm E’s case study (6.4).

As dynamic capabilities are fundamentally supported by key firm processes (or routines), once again it is these processes that require intentional review and reconfiguring. The dynamic capability lifecycle (Helfat & Peteraf, 2003) is a plausible construct to mirror the particular capability to the effects of a life of finite growth. This means that internal fit needs to be constantly assessed. This endogenous assessment is itself a process and is very useful as a signpost for understanding the sustainability of a firm’s dynamic capabilities. It also means that dynamic capabilities can become redundant (Figure 3.5). The phases of the dynamic capabilities lifecycle (Helfat & Peteraf, 2003), are based on the product (Stark, 2011) and organisational lifecycle (Cameron & Whetten, 1983) approach. The “branches of the capability lifecycle diagram” (Helfat & Peteraf, 2003, p. 1005) are illustrated to include the cycle of dynamic capabilities review. With dynamic capabilities themselves being required to be renewed, the fourth research query then leads to whether or not dynamic capabilities renewal have any influence on firm growth:

Research Question 4: How does the renewal of dynamic capabilities influence firm growth?

Figure 3.5 - The dynamic capabilities lifecycle (Helfat & Peteraf, 2003, p. 1005).



3.3 Dynamic capabilities – key management skills.

This thesis is attempting to answer how a firm responds when faced with opportunities and threats in an uncertain competitive market, in particular a market where technologies, market forces and competitive behaviour are outside of the firm’s control (Augier & Teece, 2009). The strategic response must rely on a realistic interpretation of these dynamics and not a pre-determined doctrine (Rumelt et al, 1991). As enticing as the dynamic capabilities framework is in order to understand how a firm may best respond to an uncertain market, they are still difficult to identify and measure. Easterby-Smith et al (2009) suggest that

“despite the progress that has been made, the way forward is far from clear. For example, even with a clearer definition of terms, dynamic capabilities are difficult to identify” (p. S4).

They “remain hidden until exercised” ensuring that conducting research into dynamic capabilities is an active search for associated processes. The processes are indicated in 3.2 above, yet the search for them within a firm still remains a challenge. The challenge of guiding the case study data analysis can be overcome by “operationalising” dynamic capabilities (Kuuluvainen, 2012).

In the interview with Firm D’s managing director, under the section 3.3 (Appendix B) Key Skill: Business Design, the question is framed, “have you / would you make any changes to your products or your processes if you could?” The answer commences,

“Yes. You almost asked me the question I was waiting for. In the old days 50% of our old [Redacted] business was the supply of anodes where we owned the moulds, we bought the metal from the manufacturers and then the founder was casted and we would turn over hundreds of thousands of dollars a year in anodes, sacrificial anodes for boats. Nowadays the foundry’s sell direct but the foundries still can’t deliver the technical service to go and assess tank, ballast tank conditions, design CP systems and do all those things. The foundries are just floggers of metal. So we can still offer the technical stuff.”

This answer illustrates that at a certain stage (2004) the firm relinquished assets and manufacturing capability and began to change the way the firm captured value by offering technical services to the industry where before the firm only supplied materials.

This illustrates how Firm D was able to sense a change in the economic environment and went about seizing the opportunity to modify its resources to better capture value from a changed environment. The change in resources required to provide these technical services were different from the resources required to manufacture goods and hence this response can be analysed for whether sensing, seizing or transformational dynamic capabilities exist. Testing to see whether it is “evolutionary fit” is done at case study stage. Yet, it is still difficult to seek out what a firm’s particular capability, with respect to being evolutionary fit, is. Fortunately, Teece (2009) provides some insight into how a firm can be examined for evidence of dynamic capabilities processes.

“Lying at the heart of dynamic capabilities are several fundamental management/organisational skills, including: (1) learning and innovation processes; (2) business ‘design’ competence (what business model to employ); (3) investment allocation decision heuristics; (4) asset orchestration, bargaining and transactional competence; and (5) efficient governance and incentive alignment” (Teece, 2009, p. 130).

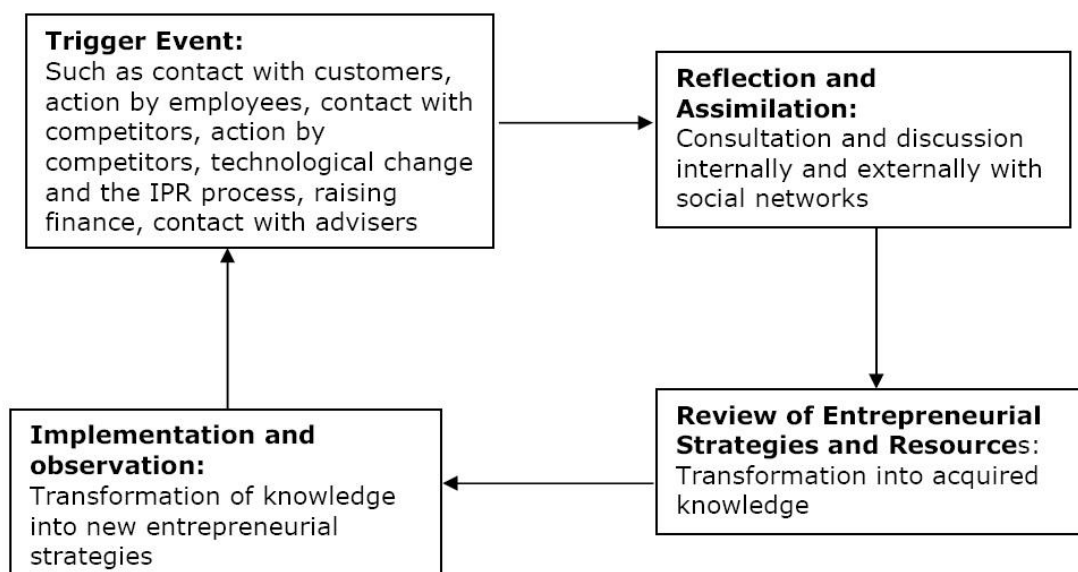
The key management skills apply to a firm in rapidly changing, competitive global environment. These external factors would appear to apply to firms operating in the New Zealand energy industry (Chapter 4) as they are subject to multi-variable competitive, regulatory, global commodity index and industry investment factors. These dynamic capabilities management skills are suggested as the operational guide to examine the ability of a firm’s related processes to grow through sensing, seizing and reconfiguring its resources (Kuuluvainen, 2012). Use of the key management skills thus is similar to how internal strengths and weaknesses are linked to the external opportunities and threats (Rugman & Verbeke, 1993). The key management skills in this case are positioned as the “critical influencing factors” (p. 291).

For the businessperson, the concept of skills expounded since Adam Smith's *An Inquiry into the Nature of the Wealth of Nations* (Smith & Garnier, 1838) is a more germane concept than the more obscure and recent dynamic capabilities framework (Teece & Pisano, 1994). The field research questions (Appendix B) are structured to include questions relating to key management skills in order to uncover the processes behind them. The metaphorical purpose of questioning the subject in a semi-structured manner via skills rather than the more than likely obscure concept of dynamic capabilities is a pragmatic one (Alvesson, 2003) whilst being as nondirective as possible (Yin, 2010). Undergirding the ability to sense, seize and transform available resources are the fundamental dynamic capabilities skills that are able to create productive opportunities for the firm (Helfat et al, 2007; Teece, 2009; Zollo & Winter, 2002). In order to answer the question "how do dynamic capabilities influence New Zealand engineering firm growth" it is necessary firstly to understand the fundamental dynamic capabilities organisational skills in order to examine the processes by which they sense, seize and transform.

3.3.1 Dynamic capabilities skill type: learning and innovation.

Identifying and effecting internal opportunities for growth depend largely on the "ability" of the manager or entrepreneur (Augier & Teece, 2008; Augier & Teece, 2009; Penrose, 2009 (1959)), especially at the early phase of firm growth (Barney, 1991; Davidsson et al, 2005). Acting on these opportunities and transforming firm resources can be described by the dynamic model of entrepreneurial learning (Deakins & Wyper, 2010) where an entrepreneur "learns from the experience of significant events" (p. 40). The role of the entrepreneur's previous experience is relevant (Politis, 2005) as many of the case studies illustrate. This provides the firm with a heightened sensing capability. Firms such as A, D, E, K, L, N and O all benefitted from the relevant learning's and experience the managing director or CEO brought to the firm. This experience ensures that the learning process is a dynamic one (Levitt & March, 1988) and once a change is sensed, a "trigger" starts a process of reflection, review and implementation of new strategies as illustrated in Figure 3.6. Seeking out triggers, use of networks, knowledge acquisition and implementation into strategies will assist in understanding whether a process is related to dynamic capabilities.

Figure 3.6 - Dynamic model of entrepreneurial learning (Deakins & Wyper, 2010, p. 45).



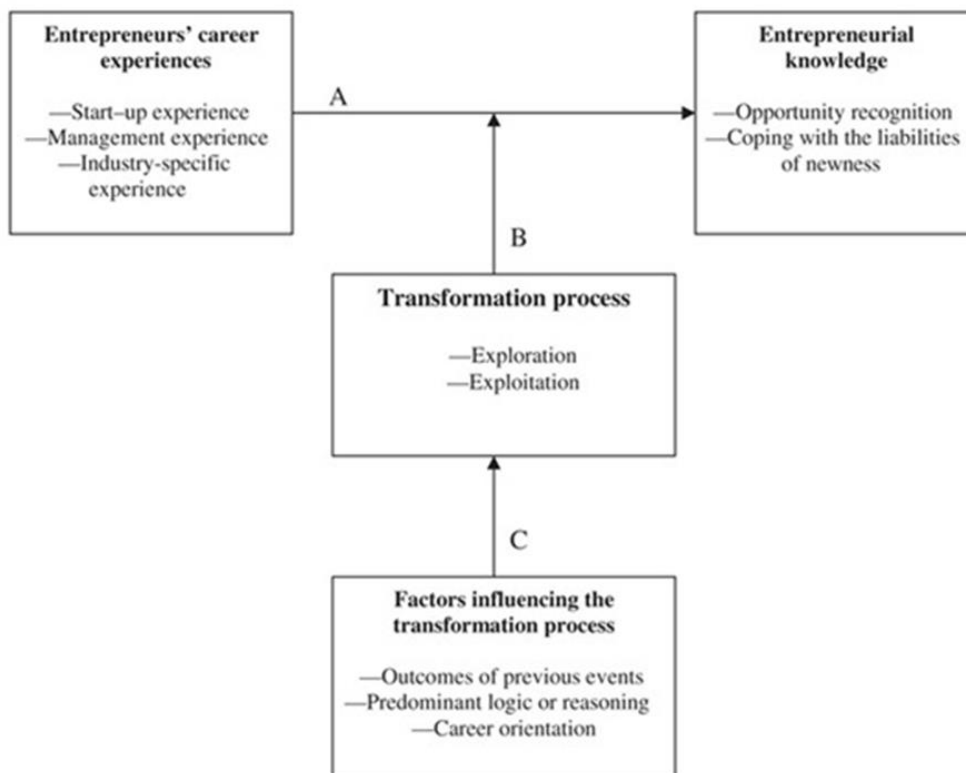
In the case of Firm E, the managing director’s “father had a commercial (contracting) business in Auckland for many years so I grew up in a contracting background”, “that’s how I got into the industry”. The benefit of this upbringing established some experiential capital (Davidsson & Honig, 2003), leading to a heightened sensing capability as evidenced when years later the managing director realised that he had to secure his human resource assets by giving key staff shares in the firm “to keep everybody committed to the plan, but also to incentivise them.” The underlying process based on the experience of the entrepreneur is one of sensing a weakness within the firm, seizing the opportunity to alter the governance and business model and transform the assets of the business (key knowledge). Understanding that the underlying skill is entrepreneurial learning and innovation helps in the analysis of the case study (Lecler & Kinghorn, 2014).

Teece (2009) suggests that “learning, knowledge-sharing and knowledge-integrating procedures are likely to be critical of business performance” (p. 44). Seeking out evidence of these processes through the key management learning and knowledge management skills illustrates the existence of dynamic capabilities. Furthermore, whilst Teece (2009) limits the learning requirement to the sensing in environmental and technological capabilities, he does describe firm knowledge management as a capability. Organisational experience translated into organisational heuristics (Bingham & Eisenhardt, 2011) is an important addition to firm learning capabilities as the example of Firm E suggests. Importantly for this study it is process driven, something able to be measured (Bingham et al, 2007). This learning process is critical to firm growth success as it builds positively on what has gone before. A study on comparative entrepreneurship (Whittaker et al, 2009) confirms this as in the empirical results “some respondents suggested that their orientations were consciously formed

as a result of past negative experiences” (p. 104). The managing director’s negative experience helped define the new firm structure. He laments,
“the way I managed the GFC. I should have laid off everybody because it was a cliff. It didn’t gradually happen, it just went bang and I should have seen that and just laid everybody off. I tried to pretend it wasn’t happening.”

His firm was clearly unprepared for the exogenous threat of the GFC. After this experience, he commented “I’ve always had complete autonomy and I still have really but I guess I am a lot more consultative these days.” Proof of this consultative path is the acquiring of external advisers and the formation of a board. After the GFC, Firm E grew dramatically as Figure 2.6 illustrated earlier. It would appear that Firm E (via the entrepreneur) has developed a strong sensing capability, an ability to seize the opportunity and in so doing transform the way knowledge is managed within the firm. The dynamic capabilities “framework emphasises that the past will impact current and future performance” (Teece, 2009, p. 48). To ensure a sustainable future, learning from the past and reconfiguring the firm for the future requires learning and innovation processes. Learning and innovation capabilities are critical for a firm’s sustainable growth (Cantwell, 2002; Garnsey, 2002; Penrose, 2009 (1959); Schumpeter, 1947). The transformational concept (Figure 3.7) of entrepreneurial learning illustrates how entrepreneurial experience coupled with transformational experience leads to entrepreneurial knowledge, a firm resource.

Figure 3.7 - Transformational concept of entrepreneurial learning (Politis, 2005, p. 402).



When these capabilities are successfully applied, a firm is able to reap the rewards of above market growth as in the case of Schlumberger operating in the global oil and gas industry (Perrons, 2014) where the market moved from ownership of extraction rights to the technology thereof. With dynamic capabilities relying on learning capabilities (Mintzberg & Lampel, 1999) as, “learning looks into the grass roots,” (p. 27) of organisations, appropriately, this skill type describes the ability of a firm to learn and acquire knowledge.

Innovation results from an interaction between the demand sensed by the firm and the entrepreneurial (learning) resources the firm contains (Penrose, 2009 (1959)). This is commonly manifested in research and development processes within a firm (Teece, 2009). The “sensing” component of dynamic capabilities is in itself reliant on the capability a firm has to acquire knowledge (Teece, 2007). The learning and innovation key skill type is a natural precursor to the intentional sensing abilities of a firm, as “the significance of resources to a firm and the productive services they can yield (are) functions of knowledge,” (Penrose, 2009 (1959), p. 68). Knowledge is deemed an asset courtesy of existing resources and is required to develop organisational capabilities (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler, 2012; Lichtenthaler & Lichtenthaler, 2009; Lichtenthaler & Muethel, 2012). For firms to grow, not only are new products required to meet sensed customer demands, but new processes are required to produce these products, hence the question of the influence on growth of dynamic capabilities renewal processes (3.2.4). Teece (2009, p. 203) suggests that “the innovation process requires active orchestration of both intangible and tangible assets by entrepreneurs and managers”. These assets include inimitable knowledge assets (Teece, 1988; Teece, 2009). The dynamic capabilities aspect of knowledge is not so much the knowledge itself, but the creation of new knowledge and integration into the processes contributing to the mechanisms of growth within the firm. The creation of knowledge occurs through the “sensing” process of learning. Understanding this will illuminate these processes in the case study analysis.

3.3.2 Dynamic capabilities skill type: efficient governance and incentive alignment.

Efficient governance is closely linked to incentives as incentives without appropriate governance carries the risks of agency, leakage and misappropriation (Teece & Pisano, 1994). Growth activities are also incentivised through the profit motive (Penrose, 2009 (1959)). The incentives for growth extend beyond monetary motivation alone (Allessandri, Tong, & Reuer, 2012).

Governance is not only related to how efficient a business model is for external “fit” to its market, but also to internal reconfigurations. As the example of Firm L confirms, a board was formed to

address the following issues of: a more complicated trading environment, underperforming existing management capabilities, a more complicated operation and a succession plan. Poor governance and incentive alignment has the effect on diminishing a firm's personnel's ability to effectively sense, seize and transform. As limitations to growth include managerial limitations (Penrose, 2009 (1959)), a firm leadership's strategic abilities have a direct role to play in the firm's ability to sense, seize and transform (Teece, 2009). Yet the effecting of this leadership in this manner varies in "real world" management (Teece, 1984). If there is poor incentive alignment, then there is a risk of dysfunctional behaviour, limiting growth. This is seen in Firm J's case, where the new owner of the firm appeared to despise, *"solicitors and bankers and accountants. So I had to deal with the banks, I had to deal with the accountants and I had to deal with the solicitors and [Redacted] unfortunately doesn't understand that you sometimes have to pay for a solicitor or an accountant"* (general manager). When the owner took over in 2009, Firm J's performance declined as Figure 6.2 illustrates.

In order to answer whether a firm's dynamic capabilities relating to governance and incentive alignment affect a firm's growth it is useful to understand what incentives are possible. "Payoff" for management incentives varies in accordance with the structure of the incentives (Allessandri et al, 2012). The term of payoff depends on the integration of the incentive with the strategy of the firm. Stock options to short term pay are such examples. The objective of this section is to recognise that a firm must engage its managers to grow value. Firm F's managing director commented he "in the last few years had bonus systems where I have a formula and pay out a portion of the profits", which did not achieve the desired result, "I was trying to use that to change habits and in fact I got quite disappointed because all that happened was the guys were like when's the next bonus." Not satisfied with this outcome, the managing director then seized the opportunity of an external threat, a decline in market opportunities, made some staff redundant and found "actually the fear of losing something often creates more impetus to change." Whilst the incentive appears counterproductive, the result contributed to an improvement in performance and profitability in the face of market threats. By changing the motive via a changed incentive (Loasby, 2010), Firm F improved profitability and in so doing has given itself the best opportunity to grow (Davidsson et al, 2009).

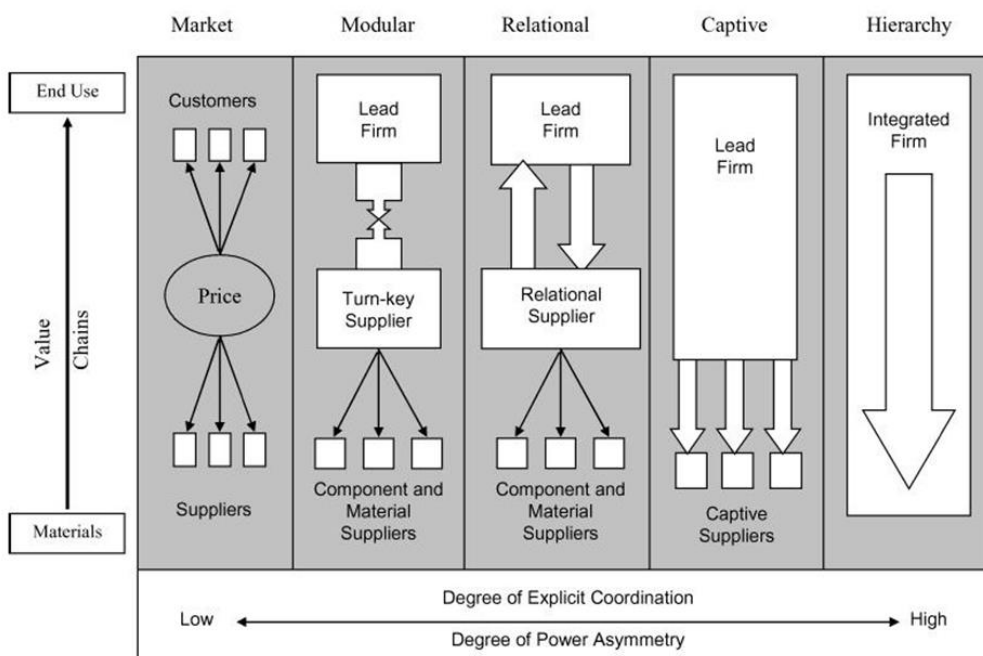
These two examples serve to illustrate that when examining the firm's processes for evidence of dynamic capabilities it is helpful to seek evidence of the skills underlying alignment of governance and incentives.

3.3.3 Dynamic capabilities skill type: business design.

“The business model, as a source of value, can help explain why some firms outperform others; it provides a rationale for value creation” (Zott & Amit, 2008, p. 2), the business model representing the organisation of the firm’s functions (Davidsson et al, 2009). The firm’s business model “defines the manner in which a business enterprise delivers value to customers” (Teece, 2009, p. 24). More specifically, “how the revenue and cost structure” is designed and modified to meet market needs, how the firm resources are “assembled” and how value is “created and captured” (Teece, 2009, p. 121). In the co-ordination of productive resources to define the business model as mentioned above, a firm effectively establishes linkages between activities (Kay, 2002).

Whilst Teece suggests that designing a “good business model” is partly an “art” (2009, p. 26), the process of doing so intentionally (strategically) still involves certain skills. The skill of selecting a good business model requires; analysing alternative models, understanding the needs of the market, understanding the value chain and maintaining a neutral perspective (Teece, 2009) thereby avoiding agency issues (Teece, 2007). Coordinating these processes to arrive at the most appropriate business model for the firm’s resources in their market is important. Co-ordinated activities are termed “value chains” (Porter & Millar, 1985; Williamson, 2010). Value chain theory, if only to understand how it applies to the selection of business models as Figure 3.8 illustrates, assists in understanding the most appropriate business model for the delivery of value to the market and hence profits (Gereffi et al, 2005). The value chain governance types are then useful to understand how a firm has configured itself to best fit (and capture value from) the market environment, or not as the case may be with many New Zealand businesses as suggested by a prominent business author in the midst of the Global Financial Crisis (Brian Gaynor, 17 September 2011).

Figure 3.8 - Five global value chain governance types (Gereffi et al, 2005, p. 89).



Firm D's case study illustrates how the commoditisation of products changed the firm's focus from supply of goods to supply of technical expertise in the use of these products from 2004. The managing director commented,

"it was our aim to have a small but efficient sales and marketing organisation and within three months it was clear that following the collapse of our competitors the market was not comfortable with the quality of service that they were getting on an engineering side."

This change in business model from one stocking and selling products to one providing specialised engineering services was recognised (sensed) and created (seized). In order to support this model in a sustainable manner, key resources (specialist engineering skills) required to be modified and enhanced. Exogenous motivations causing a firm to reconfigure its business model with existing resources depends on: technology, target market segment, financial terms, sales strategies (product mixes) and market entry structure (Teece, 2010; Teece, 2009). The efficiency of a firm's administrative framework and its associated bureaucratic functions can be illustrated by the lack of management intervention (Augier & Teece, 2009). Seeking out evidence of strategic thought, comparisons, appropriate interaction at various levels in the organisation and changes to business models in response to external and internal changes signals the existence of dynamic capabilities processes.

3.3.4 Dynamic capabilities skill type: investment allocation.

Strategic investment in a firm's resources in order to maintain a competitive position is a dynamic capabilities management skill. It requires the intentional assessment of external and internal "fit" of firm resources, the ability to change where the investment is allocated and then the fundamental altering of key resources through such investment. Firm L for example invested scarce capital in a vertical processing facility in 2012, creating a strategic advantage over its competitors and to capture value from a market demanding added value. The ability to understand that this investment came about from the entrepreneur's sensing a market opportunity (or threat); seizing it through this investment he was able to capture further value from the market. Conversely, existing enterprise requires further investment just to enable the firm to maintain the returns of the original investment (Penrose, 2009 (1959); Teece & Pisano, 1994). Management skills of investment in "manufacturing, marketing and management" (Chandler, 1992, p. 486) requires a more resource transformational approach and not be irreversible (Teece, 1986).

Decisions involved in the allocation of the investment vary. They could be related to how much to invest in an area to protect a firm's market position such as establishing an "appropriability regime"

(Teece, 1988; Teece & Pisano, 1994). Firm P invested in key employees to spend time on technical boards where standards and rules for the industry are established. By doing this Firm P was able to influence the direction of the industry, the managing director commented on Firm P’s involvement on an industry committee,

“I think we should do everything we can to improve the industry. If the industry is better and we are a key player we must benefit.”

Investment is difficult for firms when markets change. Firm N recognised (sensed) in 2007 that investment in a particular area was not providing the returns, “we weren’t making any money out of that market for the investment we had.” The response was to actively change Firm N’s relationship with its key suppliers to one of a more collaborative one. Against the headwinds of the global financial crisis and a decline in the New Zealand manufacturing index (Figure 3.9), Firm N managed to continue growing (Figure 3.10) through offering more innovative (and more expensive) products and services to its market.

Figure 3.9 – New Zealand manufacturing index 2000-2012 (www.stats.govt.nz/infoshare).

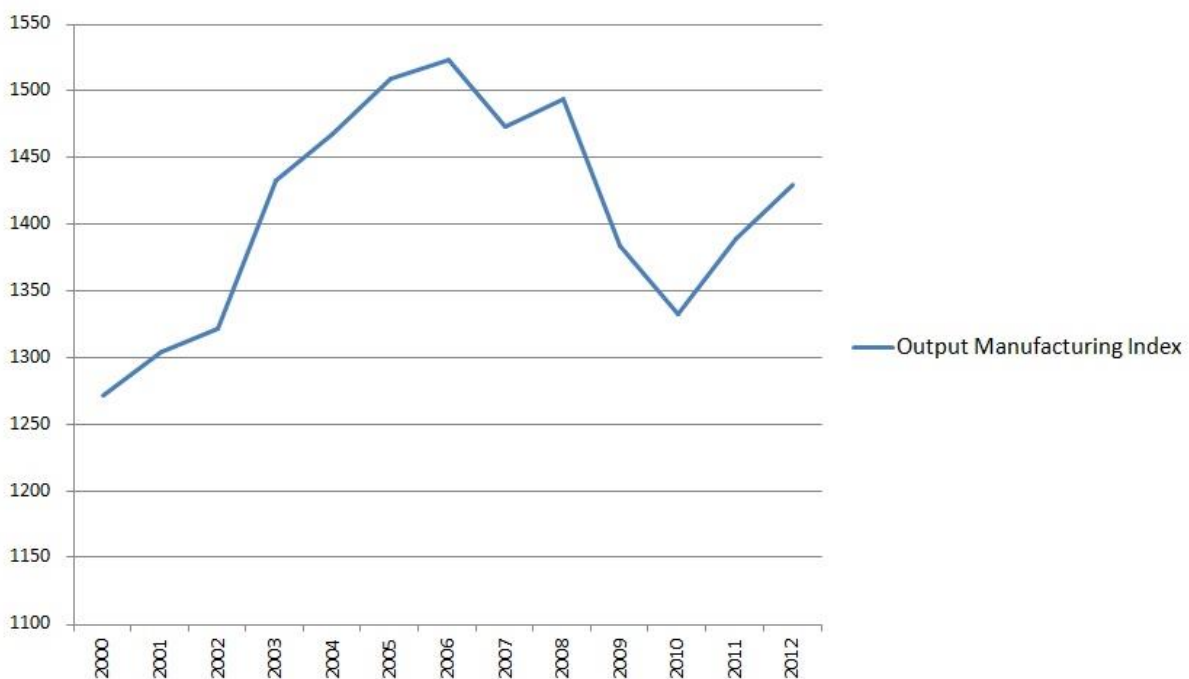
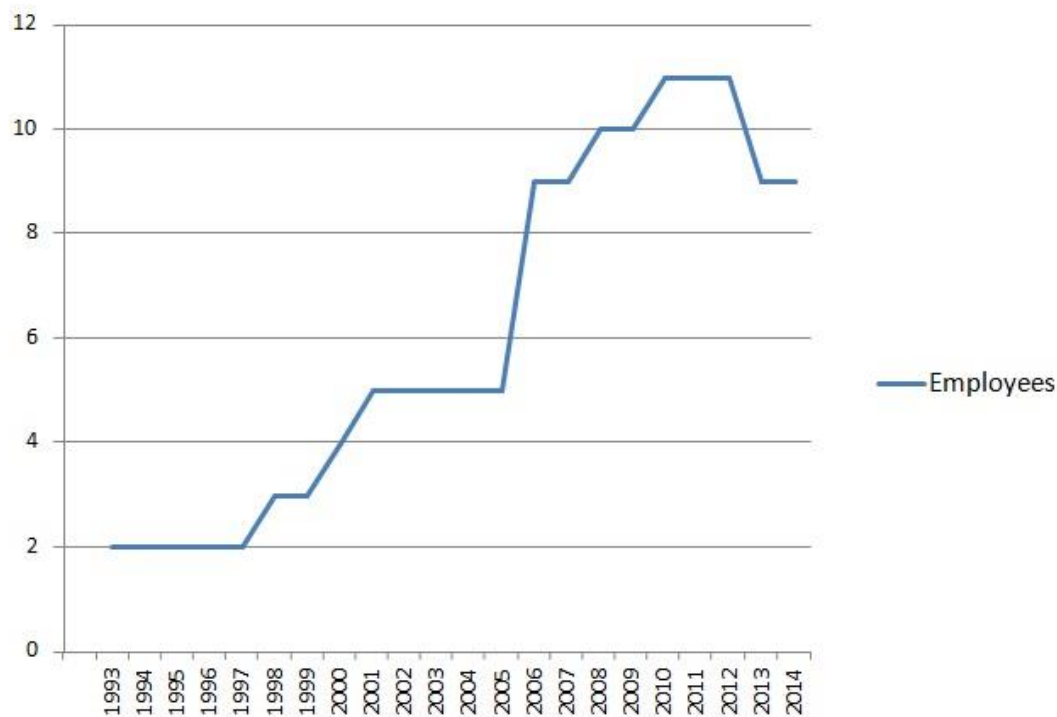


Figure 3.10 – Firm N growth trajectory.



The descriptions above are helpful to the researcher when identifying the processes whereby the productive service of investment allocation towards available resources of the firm are analysed to see if they contribute towards growth (Helfat et al, 2007; Teece, 2009). This process helps the entrepreneur understand the “strategic fit” and hence direction of allocation of resource for the purpose of growing the firm. The challenge for smaller firms (all of the case study firms bar Firm C) is to invest based on limited knowledge as “knowledge takers” (Hine, Parker, & Verreynne, 2011) rather than as per the Schumpeterian firms’ greater capacity to invest in innovation and derive greater margins (Schumpeter, 1947) with which to establish a tight appropriability regime (the trade-off between progress and innovation). Therefore, SMEs’ strategic and intentional investment allocation must involve a process of learning (entrepreneurial in the case of smaller firms) in order to overcome the Schumpeterian trade-off (Nelson & Winter, 1982).

It is the smaller firms with minimal available resources (or assets), but with a greater entrepreneurial capability by nature of their growth phase (Garnsey, 2002; Greiner, 1998 {1972}) and entrepreneurial orientation (Quince & Whittaker, 2003), which create an internal capacity for increased competitiveness and growth. In that vein, Teece (2009) singles out complementary and co-specialised assets for special attention when discussing how a firm allocates its assets. The reason is because of the unique value they create and competitive advantage they produce when combined (Loasby, 2010). The sensing, seizing and reconfiguring (or combining) these co-specialised assets is

where the opportunity lies for innovation and hence investment. There is a continual interaction between “market opportunities of the firm and the productive services available from its own resources” (Penrose, 1960, p. 2), in other words the entrepreneur will ensure that the firm’s surplus resources (Penrose, 2009 (1959)) are allocated to maximise profits.

3.3.5 Dynamic capabilities skill type: asset orchestration.

The management skills of asset orchestration involve the configuring of co-specialised and complementary assets (Helfat, 1997) to maximise value (Teece, 2009). Assets include those intangible ones of knowledge, process and sharing nature - heuristics (Bingham et al, 2007; Teece, 2009). Assets are tangible and intangible resources such as embedded business networks (Granovetter, 2005). Firm capabilities rely on the “astute bundling or orchestration of resources” (Teece, 2014, p. 14) including reconfiguring the key firm routines (Bingham et al, 2007; Teece, 2009). Effective orchestration of these assets is a management function, not a market one (Helfat et al, 2007). As the most valuable assets of a firm are knowledge related (Teece, 2009), an increase in knowledge acquisition (Figure 3.9) will increase the productive opportunity of a firm. Whatever forms these assets take, what is important is how they are used to “effectuate” firm strategy (Teece, 2009).

Firm H’s managing director saw his brand as a firm asset, and had to go about changing the way the market saw his business, “from about 2004 onwards as well we’ve been heavily into branding. We have a very distinctive brand, it’s bright, it’s bold, it’s simple and it’s I mean it’s consistent across all of our media whether it’s vehicles, business cards, letter head whatever and so I think just time in the market that started to be recognised”, and became the “first [Redacted] company out there pushing that heavy branding and people just started to recognise hey you’re the guys in the black trucks, you’re the guys from [Redacted].”

In 2006, Firm H saw an opportunity in the Australian market and despite its limited resources found another way to take advantage of this; “what happened is that we had a good relationship with [Redacted] and the Australian economy was going really well but they were short of applicators and particularly in Queensland and so we teamed up with a local Queensland construction company.” With Firm H’s entrepreneurial approach, it leveraged off its network (Granovetter, 1973; Granovetter, 2005) and business relationships (Davidsson & Honig, 2003), aligned its unique skillset (Teece, 2007; Teece, 2009) with a larger Firm and secured a geographic growth path. Homogenous, tradable assets are required to be redesigned in order for them to become a dynamic element to a firm’s strategy. They must be able to be “adapted”, “redeployed” and “reconfigured” in the face of changing environments.

Cognition, learning and co-ordination are required in the productive application of these resources (Foss, 1999). Firm growth is also enabled through a series of intentional, strategically fit “patterned behaviours” (Winter, 2003) or processes (Bingham & Eisenhardt, 2011). This endogenous structured approach to firm growth relies on management to “create”, “extend”, “upgrade” and “protect” intangible assets (Helfat et al, 2007; Teece, 2007). By utilising a deeper understanding of the key firm management skills it is possible to overcome the limitations of the “parsimonious framework” (Teece, 2007, p. 1347) the dynamic capabilities framework may appear to be, and develop it into one which is able to be used to “perceive, explain and predict”. With this deeper understanding it is possible to measure firm processes to see if they are “evolutionary fit” and hence associated with dynamic capabilities.

3.4 Measuring dynamic capabilities.

In the face of a continuously changing marketplace, a dynamic firm activity is required to sustain a competitive advantage (Augier & Teece, 2007; Helfat et al, 2007; Teece, 2009). The unique ability to do so is harnessed by the managers and their activities. As established above, a firm can be considered as a collection of administered productive resources. By looking at the capability of the administration within the boundaries of the resources, it will be possible to establish a firm’s ability to grow through effective orchestration or direction of these resources (Augier & Teece, 2009; Helfat et al, 2007). Through an understanding of a firm’s various growth mechanisms and related processes it will be possible to confirm whether dynamic capabilities contribute to growth. If observation of the processes of multiple firms is undertaken within the boundary of one industry it will be possible to establish a “conceptual lens through which to perceive, explain and predict.”

This does not mean that “ad hoc” processes are the norm either (Helfat et al, 2007), rather decisions based on acquired knowledge (Zollo & Winter, 2002) are sought. It is the process oriented approach to not only learning, but acquiring knowledge, sharing it (heuristics) and managing it, which is of interest from a dynamic capabilities measurement point of view.

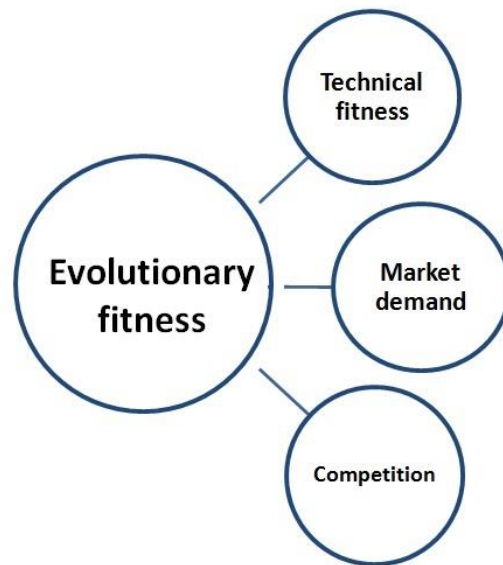
Dynamic capabilities are also considered “patterned behaviour” rather than “ad hoc behaviour” (Helfat et al, 2007; Helfat & Winter, 2011; Hine et al, 2013). To understand how a dynamic capability manifests itself is to look for shared, patterned and high performing learned processes as per Tables 3.1, 3.2 and 3.3. Organisational learning (Bingham et al, 2007) is integral to sensing, seizing and transforming resource bases in order to set the firm up for the next stage of growth. Sensing capabilities are very much a learning skill (Teece, 2007). It will then be possible to observe how dynamic capabilities drive growth through the following micro-foundation factors namely;

“difficult to imitate organisational-level innovation, change, global sourcing and global marketing routines; the business intuition and insight needed to create new business models and revenue architecture that scale globally; the investment insights, protocols, and procedures which enable the business enterprise to identify and address new markets and technologies” (Teece, 2009, p. 157).

For dynamic capabilities to be evident in the firm, the threshold required in this study, due to the high to medium velocity of the market the case study firms operate in, is placed higher than first or second firm capabilities (Hine et al, 2013). The pre-cursors of which are; that they are associated with “predominant resources; routine patterning; focus of learning tasks; and strategic intent” (p. 9). Helfat et al’s (2007) evolutionary fitness threshold for dynamic capabilities is a method with which to measure whether a firm’s capability processes are dynamic. Evolutionary fitness refers to how effectively a dynamic capabilities process enables a firm to create, modify and extend its resources. This is useful as it is a method to measure dynamic capabilities via a “yardstick¹” approach, an approach that Teece (2009) supports. Helfat et al’s (2007) factors that influence evolutionary fitness (Figure 3.11) illustrate how evolutionary and technical fitness interact. This study is primarily interested in establishing the evolutionary fitness of particular dynamic capabilities and how this contributes to firm growth. Technical fitness on the other hand is only useful to understand how a particular process contributes to the firm’s sustainable strategic advantage. The four determinants of evolutionary fitness are; the quality dimension of technical fitness, cost dimension of technical fitness, competition and market demand. Technical fitness is measured by its quality and cost dimensions (Helfat et al, 2007), evolutionary fitness encompasses these as a pre-requisite in the context of a particular market and competitive position.

¹ Collins Concise Dictionary 21st Century Edition (2001) defines “yardstick” as “a measure or standard used for comparison”.

Figure 3.11 - Factors that influence evolutionary fitness (Helfat et al, 2007, p. 8)



Firm G's growth phase from 2006 was opportunistic. The firm was able to grow by seizing the opportunity to grow through investment allocations, as the general manager asserts,

"there was the opportunity to go to a bigger pipe, so to go to a bigger pipe we bought new machinery, so it meant venturing out into China in the end to look at new machinery. Then from going to bigger machinery we had to go to recycling of mud's, so in other words recycling. So that opened up another door, it's just another arm to the business. We have a recycling system. Again it's more cost efficient."

This illustrates that the firm's ability to see an opportunity was "ad hoc", in other words the firm happened upon this opportunity, as opposed to Firm K's strategic intention to grow.

Firm K sensed a decline in the New Zealand market for its specialised engineering services as the managing director summarises,

"we have changed our marketing in the last two or three years to focus a lot more heavily on this (overseas expansion) as an opportunity than on the New Zealand market. We still market in New Zealand and we still do proposals in New Zealand, but I think this decision two or three years ago has been vindicated by the market in New Zealand in the last 12 months where there's been a lot of proposals that have come out and our success rate in those is quite low."

In 2011-2012 Firm K sensed an external threat and intentionally, or purposefully (Helfat et al, 2007) changed the way it marketed that started to pay off at a later stage. This process was not "ad hoc" and was certainly evolutionary fit. The change required an orchestration of limited resources, a change to the business model and involved embedding in the organisation a learning capability.

The dynamic capabilities theoretical framework (Teece & Pisano, 1994; Teece et al, 1997; Teece, 2007; Teece, 2009; Winter, 2003) provides an understanding on how the firm can realise internal growth opportunities. Research on how dynamic capabilities influence firm performance (not always growth related) is at its early stage. Pitelis (2002), Helfat (2007) and Teece (2009) suggest that a research opportunity exists to examine how dynamic capabilities affect firm growth. A practical response is possible (Bingham & Eisenhardt, 2011; Bingham et al, 2007; Helfat et al, 2007; Helfat & Winter, 2011) to put this understanding to work. To gain some understanding on how dynamic capabilities have been recently used to understand firm performance, some recent studies are considered.

Observing and measuring mechanisms of dynamic capabilities is possible (Eisenhardt & Martin, 2000; Hine et al, 2011; Zollo & Winter, 2002). It is also possible to identify processes and application of organisational learning as a source of dynamic capabilities, even though literature explicating how a firm's dynamic capabilities contribute to growth and performance is sparse (Zahra, Sapienza, & Davidsson, 2006). Despite some debate about the divergence of dynamic capabilities thought (Peteraf et al, 2013) as mentioned in the introduction, between the approaches of (Eisenhardt & Martin, 2000) and (Teece et al, 1997) this study is more concerned on how dynamic capabilities contribute to a firm's competitive advantage and hence sustainable growth. This thesis searches for routines and processes associated with dynamic capabilities, something both schools of dynamic capabilities thought are in agreement with (Peteraf et al, 2013).

The clarity of the current analysis of dynamic capabilities and firm performance depends on the measurable nature of the dynamic capability. A précis of these studies is warranted to establish where this research direction is heading. Early research has been published from 2008, which tends to focus on a narrow aspect of the dynamic capabilities framework. A capabilities lens was proposed to develop an understanding of competitive advantage from a market orientation perspective (Foley & Fahy, 2009). This study suggests an "empirical study should be within the specific firm and industry context" (p. 17), to establish relevance with practitioners within the industry. The motivation and intent of this research is to establish industry relevant findings.

Recent research in this vein employs various methodology such as case studies, longitudinal case studies, quantitative process sampling both as a primary as a secondary source of data. Literature currently involving a study of how firm dynamic capabilities affect some form of firm performance include: Pavlou & El Sawy (2011); Schlemmer & Webb (2008); Aramand & Valliere (2012); Kuuluvainen (2012); Evers, Andersson, & Hannibal (2012); Lichtenthaler & Muethel (2012) and

Santos-Vijande, López-Sánchez, & Trespalacios (2012). Table 3.4 summarises these and some of the findings related to some aspect of firm performance. None of these studies specifically examine firms in the energy industry nor do they consider New Zealand firms.

Table 3.4 – Summary of recent research into how dynamic capabilities influence firm performance.

Authors	Year	Firm performance measurement	Research methodology	DC skill type	Outcome	Limitation
Pavlou & El Sawy	2011	New product development.	Quantitative: Key informant.	Organisational learning.	There is a link between dynamic capability performance and organisational learning process efficacy.	Using learning associated with NPD is admitted as a narrow way to look at this link.
Schlemmer & Webb	2008	Financial.	Mixed methods: 13 case studies.	Business design & organisational learning.	DCs are effective in driving firm performance when the managing director is driving their development.	Applicability beyond SMEs is questioned.
Aramand & Valliere	2012	Changes in substantive capabilities (technical fitness).	Qualitative: 3 case studies.	Asset orchestration (entrepreneurial resources).	There is a positive link between entrepreneurial capabilities and dynamic capabilities, not vice versa.	There are too few case studies (3) analysed.
Kuuluvainen	2012	International growth (limited).	Qualitative: 1 case study.	Innovation, business design, investment allocation.	Dynamic capabilities contribute to the firm's ability to respond to the changing business environment.	Single firm case study.
Evers, Andersson & Hannibal	2012	Internationalisation.	Qualitative: critical incident technique: 6 case studies.	Organisational learning.	The role of the entrepreneur is crucial for improving the international marketing of the firm.	The case study firms are from a variety of countries.

Santos-Vijande, Lopez-Sanchez & Trespalacios	2012	Financial and customer satisfaction.	Quantitative: Lopez- Sanchez scale.	Organisational learning.	Organisational learning in a strategically flexible environment has a positive effect on firm performance.	Cross sectional data is prone to be redundant over time, rendering the outcomes limited in value.
Lichtenthaler & Meuthel	2012	Innovation performance (profitability).	Quantitative: various scales.	Innovation.	Family firms with greater family involvement have stronger innovation capabilities.	Only one key DC skill considered.

This thesis is primarily concerned with how dynamic capabilities influence firm growth. According to Peteraf et al (2013), there are two schools of thought in the dynamic capabilities debate. One school of thought is propounded by the Teece, Pisano & Shuen (1997) construct and one by the Eisenhardt & Martin (2000) construct. Whilst these two constructs differ in areas such as boundary conditions, sustainable advantage and competitive advantage, the viewpoints are in agreement that dynamic capabilities focus on routines, processes and derive their understanding from the resource based view (Barney, 1991). From this process perspective, an opportunity to develop a conversation between the two constructs exists. The dynamic capabilities construct is not itself being debated as Peteraf et al (2013) point out, but that the differences are related to how useful they are in contributing to a firm's sustainable advantage under varying economic environments. The objective of this paper is not to debate the different constructs, but to seek understanding how dynamic capabilities (may or may not) contribute to firm growth.

As this thesis is seeking understanding in one fixed economic environment, namely the energy industry in New Zealand, the contribution this research can make is to inform the conversation Peteraf et al (2013) seek to have, between the two schools of dynamic capabilities thought.

The search for existing studies of how a firm's dynamic capabilities contribute to its growth reveals some clear opportunities. Research involving dynamic capabilities and growth of New Zealand firms in a specific industry would contribute to the development of empirical dynamic capabilities knowledge, in addition to satisfying the "empirical" research calls from Hine et al (2013), Pitelis (2002), Helfat et al (2007) and Teece (2009).

Firstly by understanding key dynamic capabilities skills, then investigating associated processes, it is possible to analyse how co-ordination of firm resources via these processes at a specific inflection point, contribute to growth. A dynamic capabilities process can then be measured for evolutionary fitness (Helfat et al, 2007). The research methodology is designed to extract and analyse this data. The method of inquiry to answer "how" dynamic capabilities affect firm growth, rather than "what", has to be one that "distinguish the areas of strategy process from strategy content," and "bringing a process perspective to bear on the 'how' questions related to dynamic capabilities can help build a more complete picture" (Helfat et al, 2007, p.37). This complete picture can be achieved by operationalising dynamic capabilities in the five key management skills to understand the processes behind each of them (Helfat & Winter, 2011; Teece, 2009) and relating them to, in particular, the New Zealand engineering firm's growth to "bring us closer to an empirically relevant paradigm" (Teece, 2009, p. 108).

Chapter 4: The New Zealand energy industry.

4.1 Introduction.

New Zealand spends approximately NZD18 billion per year on energy (EECA, 2014): 26% in electricity, 38% in transport and 28% process heat and 8% other. In addition, one of New Zealand's largest exports, crude oil, is also the largest export to New Zealand's regional neighbour, Australia (MBIE, 2014). During the energy reforms of the late 1990's a focus on the interactions between energy efficiency and economic efficiency resulted in two paradigms being promulgated (Gunn, 1997). One of these is the "supply side paradigm", the other the "demand side paradigm." The supply side paradigm had an impact on industry investment decisions, where increasing competition resulted in efficiencies, particularly "dynamic efficiencies" that optimised investment for short run returns. These in turn impact the market opportunities presented to engineering firms operating in the industry. Fast forward to 2014, when the industry went through a series of privatisations of former state owned enterprises (SOEs), investment in fixed assets and productivity is declining (MBIE, 2014). Yet there are still opportunities for the firms such as small to medium sized engineering firms servicing this sector as the managing director of Firm B commented, "even if the economy is shit you can still make money as well."

The New Zealand engineering firm has a long history with supporting the larger players in the industry. In Taranaki, since the discovery of oil as far back as 1886, local firms have been working alongside larger multinationals like Royal Dutch Shell. In so doing the *"present-day oil and gas industry is built on this experience and global best practice. The region's systems, knowledge, capability, workforce and relationships have evolved over the years, as local companies work alongside the international operators, and now present a mature and highly regarded industry base"* (Venture Taranaki, 2015, p. 35).

A good example of this relationship is Firm P, starting in 1869 saw itself grow from a small family owned business for over a century. Thereafter as the Taranaki gas fields expanded since 1974 onwards, firm P was able to take advantage of this market opportunity and grow to become the market leader it is today. In order to determine whether dynamic capabilities processes offer a firm strategic competitive advantages a fixed context is required (Helfat et al, 2007). Firms which organise their processes and routines directing key resources more efficiently than the market are able to derive above market rents (Coase, 1937; Teece et al, 1997), suggesting that when the markets change, reorganisation of these processes and routines is required to sustain these rents. Thus it is important to maintain a constant industry context within which to analyse the efficacy of the change

of key firm processes in influencing firm growth. By fixing market factors, such as demand and competition (Penrose, 2009 (1959)), the firm's capacity to grow can be analysed within the fixed context. Setting the context of the research is also supported by a case study methodology as "case studies seek to study phenomena in their contexts" (Gibbert, Ruigrok, & Wicki, 2008, p. 1466).

Whilst the industry context is important within which to analyse the firm's capacity to recognise and capture opportunities or ward off threats and adjust their firm resources in the pursuit of further profitable opportunities, it is important to keep the focus on the unit of analysis: the firm. The context selected is analysing growth of engineering firms operating in the New Zealand energy industry. The New Zealand energy industry is influenced by many external factors including legislation, demand, the regional and international industry changes for example. As the industry affects the growth opportunities and threats of the firm these factors are outlined to provide this industry context.

The energy industry was responsible for New Zealand's fourth largest export in 2010 in the form of crude oil and identified as a growth area (MED {MBIE}, 2011a). The energy industry, locally, regionally and globally has undergone periods of renewed investment and shocks, creating opportunities and threats for firm growth. When Methanex invested money in expanding its ethanol plant in New Plymouth recently (PEPANZ, 2012), many engineering enterprises benefitted (Venture Taranaki, 2012). Job growth was realised in Queensland from investment in the oil and gas sector in Queensland (Queensland Government, 2011). Negative impacts globally and regionally have a corresponding effect on growth opportunities available in the industry as the CEO of Organisation S commented, "the tsunami impact has been the slowdown in the Australian economy."

Figure 4.1 illustrates the impact global commodity prices have on the value of imported pipe for the oil and gas industry in New Zealand. As this pipe is not manufactured locally, the imported value of it can be regarded as an indicator of investment in the industry. This index can then be used to provide a constant context for those firms dependent on investment in the New Zealand oil and gas sector for their growth opportunities. With the partial exception of Firms A, C, I, K and N the other case study Firms' economic environments are influenced heavily by this index. The balance of firms are subject to other indices such as the growth in geothermal investment affecting Firm I and K for example.

Figure 4.1 - Total imported value of iron, steel pipe for the NZ oil and gas industries and imported price of crude oil and petroleum.

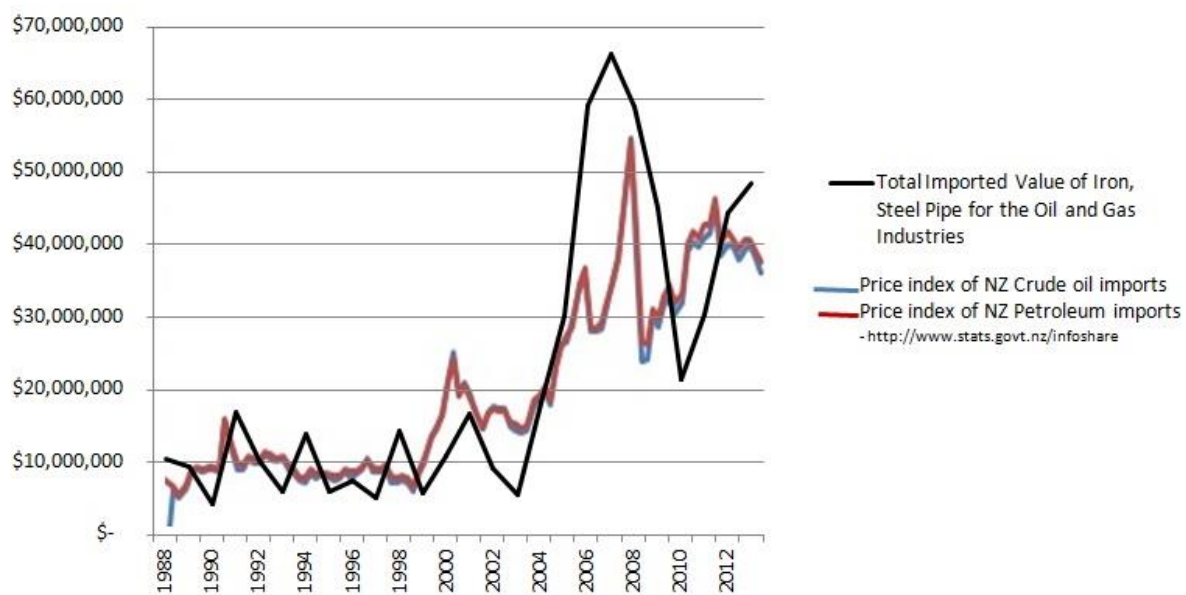


Figure 4.1 also illustrates the dynamic nature of the market within which the case study firms operate. This dynamic nature offers an opportunity to understand the Teece dynamic capabilities framework further within this context as the threshold of “ever-changing” marketplace pre-requisite is met. This research is seeking to illustrate via the dynamic capabilities framework how a firm then responds to the opportunities and threats presented by the energy industry in New Zealand by removing the environmental constraint or improving the “productive opportunity” (Penrose, 2009 (1959)). The challenge therefore is to understand how New Zealand firms, operating in the industry, can grow within this globally influenced industry, fraught with externalities beyond any one actor’s control (Florini & Sovacool, 2009).

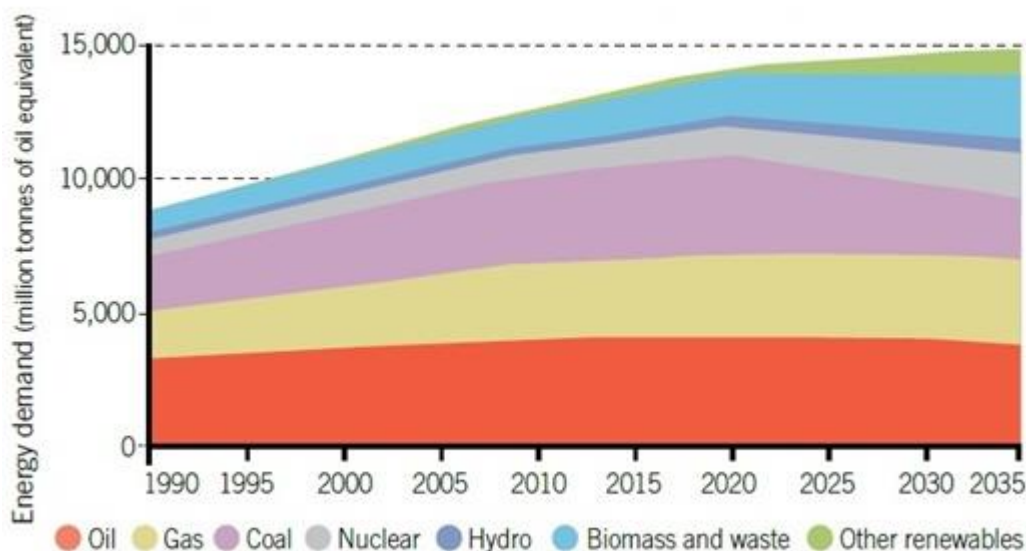
Growth can also be constrained by the external economic environment such as regulations, standards and ethics (Teece, 2009). The CEO of Firm C commented that the, “lack of sophisticated infrastructure thinking in regulatory and policy spaces is quite concerning.” Smaller firms such as Firm M also faces regulatory growth constraints as discussed in 4.4 below.

Effects of global and local standards a local business has to comply with are many. As these rules change, sometimes quickly, the agile and “fit” firm is better placed to adjust its processes and resources to achieve a better evolutionary trajectory. This chapter will illustrate the dynamics of this industry such that the industry context provides an applicable opportunity to analyse whether a firm’s dynamic capabilities processes influence its growth. Before embarking on a summary of the local industry, it is necessary to consider the global and regional industry, both of which have an impact on the local industry.

4.2 The global energy industry.

The International Energy Agency was set up in 1973 and now represents 28 member countries; New Zealand included (International Energy Agency, 2012). The energy industry is divided into 25 categories ranging from bio-energy to wind-power. Also included is climate change and transport. There is renewed focus in some countries in oil and gas production along with focus on energy efficiency (International Energy Agency, 2012). Global energy demand is set to increase by 33% of today's demand by 2035 (Figure 4.2), the bulk of which is made up by the increasing demand and change in the mix of energy production from China, India, Japan and the European Union. Electricity demand, driven by emerging economies is set to increase by 70% by 2035 (International Energy Agency, 2012). Already over half the nearly USD5 Trillion needed to meet this demand globally through renewable sources alone has been committed to meet 2020 targets. This demand is set to be met by increased exploration, technology, infrastructure development and restructuring of existing assets and supply chains. Alongside this, "big oil" is increasingly focusing on exploration rather than traditional distribution networks (Business Monitor International, 2013; National Business Review, 22 August 2012). The scale of this global investment has implications for the regional and thence local energy industry.

Figure 4.2 – Global Energy Demand Forecast. (Ministry of economic development (MED), 2011, p. 2).



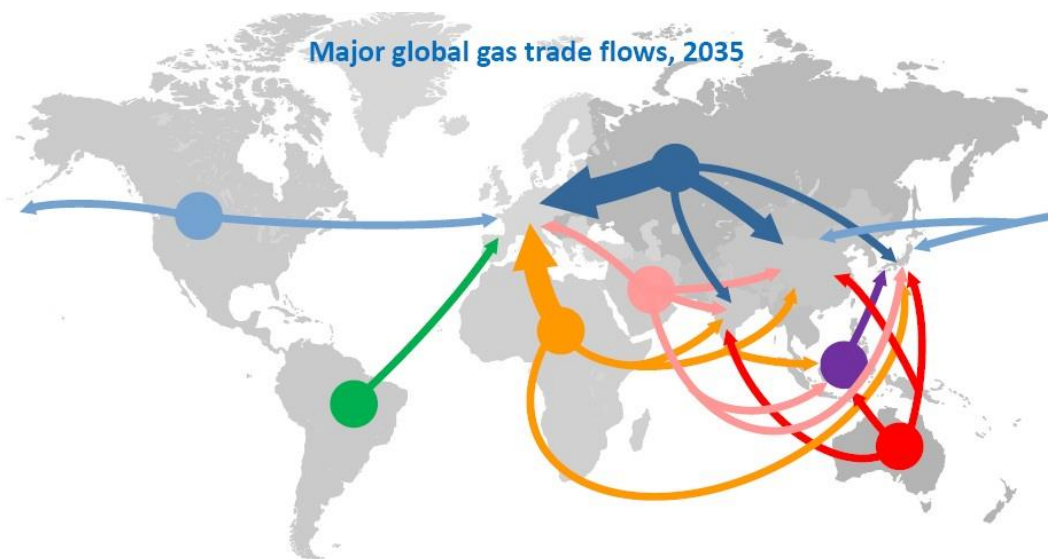
4.3 The regional energy industry.

In Australia, Papua New Guinea and to a certain extent Indonesia there has been a stellar “resource boom” (Business Monitor International, 2013; Refining New Zealand, 2012; The Australian Pipeliner, October 2012), one aspect of which is the development at an unprecedented scale of energy resource infrastructure (Queensland Government, 2011). For example the growth in the Liquid Natural Gas (LNG) industry has resulted in approximately AUD45 billion already committed to the Queensland economy’s (Queensland Department of Employment, Economic Development and Innovation, 2009; Queensland Government, 2011). This and other developments have largely been driven by demand created by the likes of the Origin Energy AUD90 billion contract to supply China’s growing energy demand (Australia/New Zealand Reference Centre, 2011).

Yet recent global events have had a destabilising effect on the investment in the industry regionally. From these periods of substantial investment, the recent drop in global oil prices has had a negative effect on investment in the industry. The effect such as, “no greenfield LNG projects have yet been announced in Australia since Shell deserted its Arrow LNG project in the Bowen and Surat Basins in January (2015) in the wake of the collapse in oil prices” (International Energy Agency, 2015, p. 14) has an effect on not only Australian based firms, but New Zealand firms operating in Australia. Negative impacts have a corresponding effect on growth opportunities available in the industry.

There are many factors in the regional energy industry offering the firm operating within it opportunities and threats; the “demand” side of economic theory (Marris, 2002). According to reports presented by Christine Forster of Platts International (The Australian Pipeliner, October 2012), the Asia Pacific Region is the world’s largest importer of Liquid Natural Gas. Australia is set to become the largest LNG exporter in the world, overtaking Qatar in the next few years (International Energy Agency, 2015). Figure 4.5 illustrates how well positioned Australia is in the Asia Pacific Region for supplying the energy needs to South East Asia. For a firm operating in this regional energy industry, this would appear to offer market growth opportunities. Major industry changes such as the move of Royal Dutch Shell’s integrated gas business (outside North America) from Europe to Singapore (Business Monitor International, 2013), would also be an encouraging sign. It would appear that regionally, Australia and New Zealand are in a position where country specific advantages (CSAs) can provide a competitive edge, namely location to market, resources and possibly unique related skills (Rugman et al, 2012), such as Figure 4.3 illustrates. Many SMEs benefit as regional energy exploration, extraction, compression plants, transmission, and storage facilities projects’ opportunities emerge (The Australian Pipeliner, October 2012). Firms D, E, K, L and O have all recently developed business beyond the traditional New Zealand, Australian and Pacific Island markets.

Figure 4.3 – Diversified Trade Flows of unconventional gas and LNG (Source: IEA, 2012, p. 7).



4.4 The New Zealand energy industry.

The energy industry in New Zealand is categorised in two sectors (MBIE, 2014); petroleum and minerals (ANZSIC Code B) and utilities (ANZSIC Code D). Both these sectors provide opportunities for and threats to growth for case study Firms A to P. Organisations Q, R and S also represent firms in these sectors, many of which are SMEs. It is these SMEs that benefit from large scale investment in this industry and create new jobs and contribute to New Zealand regional development (Venture Taranaki, 2015). For that reason, it is important to understand how the New Zealand energy industry can contribute to New Zealand’s wealth not from a “demand” side of the economy, but from the “supply” side. There are many challenges however. The CEO of Firm C, a large energy utility, suggests,

“the biggest threat to the industry is utilities’ inward focus, basically just burying their heads in the sand saying that the industry is going to carry on for the next 70 years how it has been for the last 70 years, so a complete denial around how the world is changing around them and that holding onto kind of legacy models”.

The CEO of Firm C illustrates how conducting business as if the economic environment is static is embedded in the industry. The CEO of industry Organisation Q also suggests that the industry is similarly held back despite importing skills, “our problem is they start trying to reinvent the UK here instead of looking at what we’ve got.”

With many SMEs relying on Firm C for work, it is important that these challenges are overcome. With Firm C presenting SMEs with both an opportunity and threat to growth, removing the barriers to

growth would be advantageous to this study's unit of analysis: the SME operating in the industry. Firm C's CEO again," the other big risk is the political risk, that there's regulation and legislation that stifles innovation." It would appear that SMEs have very little control over the threats to growth.

This lack of control need not be the case, as existing in the industry are many business associations. This research has included three of these as per table 5.2 (Chapter 5). To counter the forces against innovation in the industry as suggested by the CEO of Firm C, the CEO of Industry Organisation Q commented on one of the roles his organisation play; "the way we advocate around procurement should result in innovation coming through." The director of Industry Organisation R also illustrates how it assists its members in driving innovation in the industry despite the barriers, "you can see how our work related to innovation in our structural steel system which is implemented in our standards framework." Standards frameworks are one way SME members of this organisation level the playing field. For example the CEO of Firm A says one of the benefits of having industry standards is that, "if you find a problem with standards or drawings or things like that we've got a formal route to follow to flag them."

This observation is consistent with the role of standards; otherwise known as the "rules of the game"; in the industry as (Tasker, Shaw, & Kelly, 2014, p. 200) comment,

"they help to codify new and emergent knowledge to enable exploitation. They can promote the diffusion of knowledge, accelerate speed to market and reduce risk allowing the attraction of affordable capital, and can promote competitive advantage."

Of course standards are not limited to one country. In the energy industry, international standards (eg ISO) and regional (eg AS/NZ, EU) are referenced along with country standards applied globally (eg BS, ASTM, DIN and others). It is the firm that benefits when they are able to comply and exploit, such as the example of Firm M,

"we are using different standards all the time, British standards and Australian standards and American standards and New Zealand standards", "we have an engineer that controls all that side of it. It's not a great deal of difference. Even the American way of welding a pressure vessel is not much different from an Australian one or an English one or a New Zealand one."

Thus standards also provide a firm a growth mechanism through a technological base or even a related-linked expansion (Kay, 2002; Penrose, 1960).

The above serves to illustrate how an SME operating in the New Zealand energy industry is affected by forces beyond its control and the role organisations representing them can counter these forces. These forces include the effects of significant energy development in Australia, that many New Zealand firms such as Firms A, D, E, K, L O and P exploited. Whilst these developments dwarf similar activity in New Zealand, they are nonetheless important as the local energy industry geared up for

growth from 2011 (Venture Taranaki, 2012). In New Zealand significant investment has been undertaken in a number of major energy projects. Refining NZ is near completion of its \$365 million expansion of its petrol manufacturing facility (Refining New Zealand, 2012). Methanex has undertaken an \$800 million investment in increased capacity at its methanol plant (Methanex, 2011; Venture Taranaki, 2012), benefitting many New Zealand SMEs (PEPANZ, 2012; Venture Taranaki, 2012). The last few years has seen oil and gas exploration in New Zealand grow significantly (National Business Review, 22 August 2012).

More recently, though, the industry landscape has changed. Global events have affected the oil price, itself an index of investment in the industry as Figure 4.1 illustrates. The change in regional investment such as Figure 4.3 highlights represents an external threat to the firms operating in the industry.

The above background illustrates the impact global and regional events have had on the market opportunities available to SMEs operating in the energy industry in New Zealand. Local events have also had an impact on investment in the industry. Legislation to open up the New Zealand State Owned Enterprises associated with electricity generation have exposed these firms to a marketplace where returns to shareholders other than just the New Zealand government are paramount (Economist Intelligence Unit, 19 March 2014; Economist Intelligence Unit, 3 September 2013).

As the electricity industry in New Zealand is now exposed to the marketplace via New Zealand Stock Exchange (NZX) public listings such as; Genesis Energy Limited (GNE), Meridian Energy Limited (MEL) and Mighty River Power Limited (MRP), SMEs providing a service to them are, by extension, exposed to these same marketplace opportunities and threats. In the current environment as suggested by the latest index as Figure 4.1 and 4.3 illustrate, growth opportunities for these businesses have diminished, something pointed out just prior to the electricity company reforms of the late 1990's (Gunn, 1997). There are also similarities in the electricity reforms undergone Europe in the late 1990's and the market dynamics occurring now in New Zealand with the semi-privatisation of power companies. When the Western European market was deregulated power companies offered a short period of fierce competition, after which market consolidation or "oligopolies" began to form (Jamasp & Pollitt, 2005; Midttun, Henrikson, & Micola, 2001). Taking a leaf from the European experience, the profitability of the market with multiple players diminishes as the higher costs of production are removed from the market, forcing market changes such as consolidation and corporatisation across borders.

The effect this has on industry and SMEs when a major domestic threat arises such as the Tiwai Point smelter closure threat is to ultimately reduce potential investment opportunities through lower profits (National Business Review, 16 July 2013). Lower profits at a large New Zealand transmission,

distributor and retailer have been attributed to regulations limiting the amount the firm is able to charge for certain services (National Business Review, 20 February 2015). The CEO of Firm A commented on the effect of changes within its major customer (a large energy firm),

“going through reorganisation with a new CEO and finishing off all their major projects and trying to do everything in-house so that’s less work for us. From a lines company side, the roll on effect of no more wind generation and no more geothermal as all the projects put on hold due to oversupply of generation.”

For a firm primarily providing services to the geothermal industry in New Zealand, Firm K does not have a positive picture of its future in New Zealand. The business development manager commented, *“there’s no big projects around so those proposal costs are pretty high. The chance of winning at the moment is, whether it’s because of the client procurement rules and the likes, the New Zealand market isn’t looking rosy at all and doesn’t appear to have a very strong future.”*

Firm K grew at the same time the growth opportunity in geothermal investment presented itself. As one of only two such specialised firms in New Zealand it would be fair to say Firm K seized the opportunity to grow as Figure 4.4 and 4.5 illustrate.

Figure 4.4 – Firm K growth trajectory indicating the period of growth synonymous with the period of industry growth as indicated in Figure 4.7.

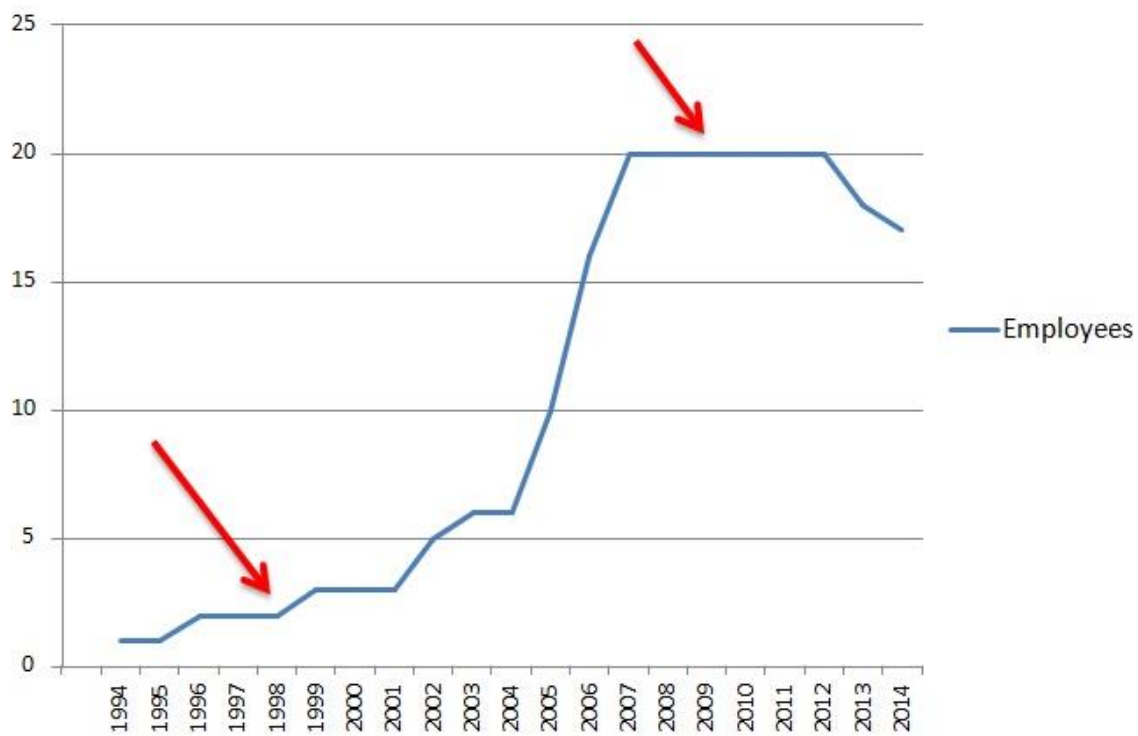
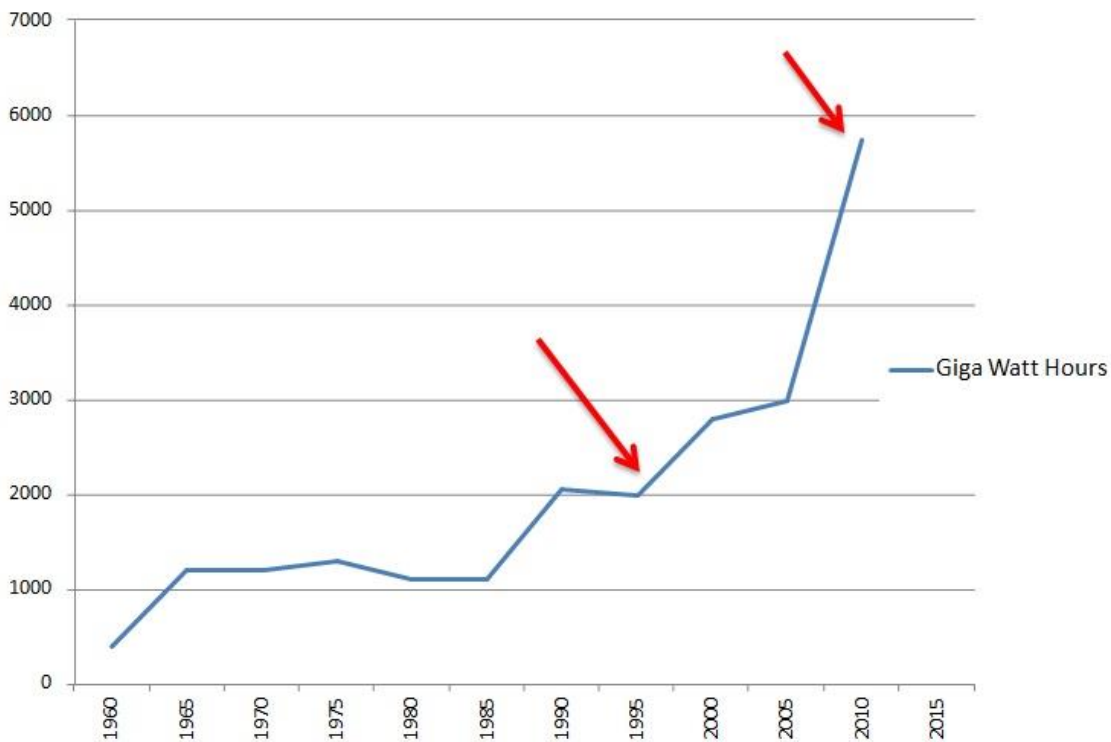


Figure 4.5 – Growth in NZ geothermal power production (Giga Watt Hours) – NZ Geothermal Association -http://www.nzgeothermal.org.nz/elec_geo.html.



With this industry context it is possible to analyse what firms' key processes were introduced or implemented at a particular time. As dynamic capabilities "are about identifying the foundations that undergird long-run enterprise growth and prosperity," (Teece, 2009, p.118), they would appear to offer an opportunity to provide a mechanism for the firm to adapt to the ever changing economic environment the firm operates in. As has been shown above, the firm's immediate economic environment is influenced in turn by global, regional and local influences.

To an SME, dynamic capabilities may appear to be a confusing framework especially when many of them do not even have a business plan, such as Firms G, J, L and M. Yet even these firms do exhibit some dynamic capabilities processes as the case studies describe. The identification of the dynamic capability processes is described in Chapter 3 and 5. These then can be tested for evolutionary fitness and ascribed as a dynamic capability (evolutionary fit) or an ordinary process (technical fit). Thus data collection and the corresponding analysis can take place against the backdrop of the constant industry context.

Changes have made securing work for a New Zealand SME more onerous as the managing director of Firm K suggests, "our whole delivery method for engineering has transformed in the 30 years of my career and now it's almost completely delivered by consultancies", "our clients think they have little choice because a lot of the procurement decisions are managed by or driven by corporates."

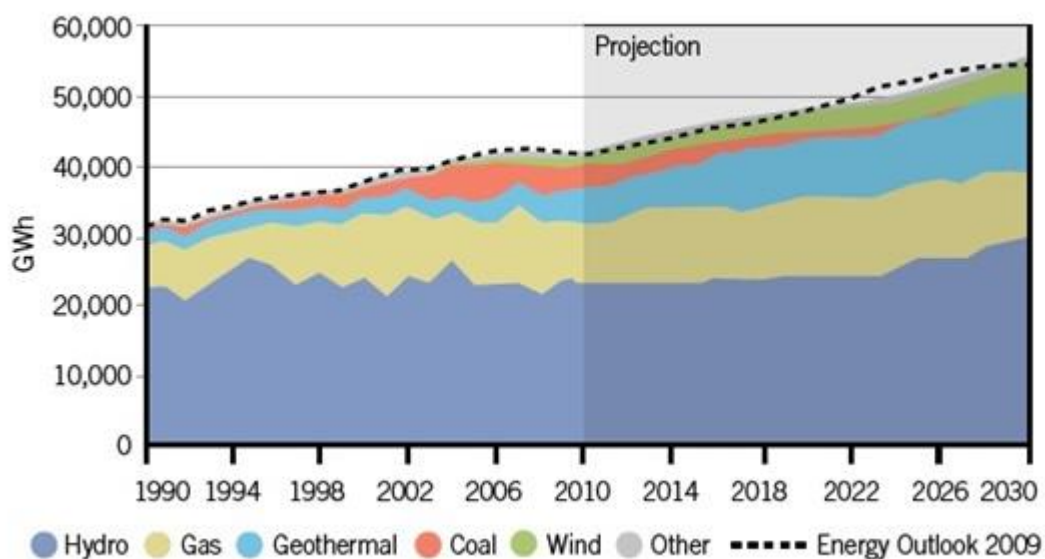
There is an international parallel in the Danish engineering market. In the Nordic energy industry model, Denmark stands out as a unique electricity market in a region of multinational and publicly owned generation. The bulk of the diversified (co-generation) generator businesses in Denmark is municipality or privately owned (Midttun, Handeland, Henrikson, Micola, & Omland, 2001). Denmark also ranks highest in co-generation capabilities in the OECD (International Energy Agency, 2009) where national policies do not involve subsidies for such innovation thus ensuring Danish engineering firms compete on an equal footing. Denmark engineering SMEs are increasingly exporting (products and services), sometimes in response to external threats (such as market limits) to take advantage of diversification growth opportunities, or in Penrosian terms, growing from technological bases, market linkages and possibly related-linked expansion (Brandl, 2010). These firms add approximately USD1.5 billion through exports to Denmark's GDP (0.4%). New Zealand's equivalent sector added USD127 million through exports in 2015 (Statistics New Zealand, 2015). This equates to approximately 0.06% of New Zealand's GDP, or seven times smaller than what Denmark's equivalent sector adds to Denmark's GDP. If New Zealand aspires to export skills and knowledge in the energy industry as the New Zealand Energy Strategy 2011-2021 espouses (MED {MBIE}, 2011a), then this example would suggest firms servicing the energy industry, such as the engineering firms outlined in this thesis, have much to do.

This example serves to illustrate how a relatively small, limited market opportunity in another region has led to growth strategies for engineering SMEs which possess specialised advantages to seek growth offshore. Figure 4.6 illustrates the growth opportunities in New Zealand’s energy sector. Recent debate has cast this growth into doubt (National Business Review, 16 July 2013). SMEs supplying products and services to the local electricity industry have noted that there is a large scale fall off in investment in this sector. This is confirmed by several comments from the interviewees such as Firm K’s managing director saying,

“the power market has died for everyone in the last 12 months, and the last power station was finished earlier this year. There are no other power stations, not large ones for some time. So our market in New Zealand has disappeared in the last year.”

The latter comment coupled with the changes in the industry makes the MBIE (MED) growth curve (Figure 4.6) look optimistic, at best rendering information available from official sources subject to question. The energy industry, on one hand purported to present an opportunity as per Figure 4.6 or on the other hand when the industry presents a threat, as Firm K suggests above, serves to illustrate the challenges the SME faces. This study proposes to shed some light on how a firm is able to “perceive” and “predict” (Pitelis, 2002) these challenges in order to modify internal resources to counter them.

Figure 4.6 – New Zealand Electricity Generation Growth Mix. Source: Ministry of Economic Development (MED), 2011, p. 2



4.5 The legislative environment.

As with many commodities, the global flow of all forms of energy is subject to supply and demand economics, national interests, interest groups, and technological advances (Florini & Sovacool, 2009; Florini, 2012). This flow is beset with many problems, not least of which is governance of energy globally, regionally and locally. There are a myriad of laws, regulations and standards affecting how a New Zealand engineering firm operates in the energy industry. These need not be exclusively New Zealand centred. For example the Agreement on an International Energy Program (2008) is an intergovernmental accord to establish energy security between several countries. This type of agreement reflects particular local legislation. In a New Zealand context, the International Energy Agreement Act (1976) and the Petroleum Demand Restraint Act (1981) would be New Zealand laws taking into consideration of how the country manages energy security. The latter is explicated to illustrate the interconnectedness of the international and New Zealand legal environment. As the CEO of Firm C commented, “by virtue of the fact that through a bit of regulatory change will necessitate a change in the way we are running operations or asset planning side of the business.”

Table 4.1 summarises many such legislation and regulations governing the industry. This list is not comprehensive as many laws govern aspects of the energy industry at a national, regional and local level by inference. Examples would be: national level, Energy Companies Act 1961, regional level, Energy Companies (Buller Electricity Limited) Vesting Order 1993 and a local level, the Rotorua City Geothermal Energy Empowerment Act 1967. The legislative environment presents both threats and opportunities to the New Zealand firm. For example when Firm G sensed the requirement to implement increasingly demanding industry Health and Safety Regulations, the managing director seized this opportunity and hired a specialist in this area. From that point on (2006), the business grew dramatically, see Case Study G. However Firm M experienced a market threat when regulations are not enforced as the managing director commented,

“in India they’ve got some other bloke over there that they’re claiming is accepted by the New Zealand government, some Indian engineer. So they are getting around the regulations somehow.”

This serves to illustrate how Firm M sees the ever changing marketplace as a threat. Firm M’s managing director sees his firm as not having any control over the changes to how relevant regulations are applied.

Table 4.1 Summary of New Zealand energy industry related legislation and regulations.

Year	Title	Scope	Effect on Industry
1991	Resource Management Act	Purpose is to promote the sustainable management of natural and physical resources.	Control or limit business decisions.
1992	Gas Act	Established amongst other things the Gas Industry Company (GIC).	GIC administers the gas market and compliance.
1992	Health and Safety in Employment Act	Putting the onus on employers to ensure that employees are not harmed in their workplace.	Regulations and Codes of Practice fall under this act. These relate to workplaces, plant and equipment, processes and substances.
1998	Electricity Industry Reform Act	Ownership separation of distribution and transmission from retail and generation.	Exerts downward pressure on prices to favour consumers.
1999	Contact Energy Privatised	New Zealand “gentailer” State Owned Enterprise (SOE) privatised.	Shareholders demand market related dividends from existing assets.
1999	Health and Safety in Employment (Pipelines) Regulations	Regulates HSE matters relating to pipelines.	Sets minimum requirements for safe management of pipelines.
2002	Climate Change Response Act	Provides for New Zealand greenhouse gas emissions management systems to be aligned with international agreements, managed and management systems implemented.	Adds costs and regulations aligned with international agreements implemented.
2004	Electricity and Gas Industries Bill	Electricity supply security and the governance of the electricity and gas industries.	Updated the Electricity Act to reflect the establishment of the Electricity Commission.
2006	Crown Minerals (Petroleum Fees) Regulations	Applies to all manner of petroleum related functions, supply, prospecting and management.	Establishes the annual fee framework for remittances to the Crown (NZ Revenue).
2007	Crown Minerals (Petroleum) Regulations	Applies to all manner of petroleum related functions, supply, prospecting and management.	Regulates how companies are allowed to operate from exploration to supply.
2008	Commerce Amendment Act	Amended Commerce Commission’s scope.	Regulation of gas pipelines beyond Powerco and Vector.
2010	Electricity Industry Act	Responsibility for setting electricity pricing methodologies moved from Commerce Commission to Electricity Authority.	Set up Electricity Authority to replace Electricity Commission.

2013	Crown Minerals (Royalties for Petroleum) Regulations	Applies to firms conducting petroleum exploration and extraction.	Sets up a royalty system whereby the firms return monies to the Crown calculated by set formulae.
2013	Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations	Regulates non production and production related installations.	Regulates activities related to installation of company / organisational assets.

The role of industry organisations, representing many SMEs play a role in advocating for a growth friendly environment. Firm M did not belong to any advocacy organisation such as Organisations Q, R and S. Organisation R represents 228 associate members, 167 consultants, 118 fabricators, 47 product suppliers, 66 service providers and has 19 reciprocal members. These members are largely SMEs (less than 250 employees). These advocacy organisations exist for many purposes but are a mechanism for an SME to counter the market threat of a regulation or application thereof or even shape the market when a sufficiently powerful lobby group. The CEO of Organisation Q says he spends, “a reasonable amount of time down the hill at the Beehive and we talk to select committees, we talk to Ministers and people like that and spokespeople down there about industry related issues.” Adapting to these industry changes or challenges is a key foundation for dynamic capabilities (Augier & Teece, 2008; Kraatz, 1998; Kraatz & Zajac, 2001; Zahra et al, 2006) and is vital for the SME’s sustained growth. In Firm M’s case, there does not appear to be any ability (capability) or even will (strategic intent) to adapt. Nor has Firm M grown sustainably over time.

On the other hand, Firm P’s involvement has assisted itself in its advocacy for better industry performance as the managing director of Firm P commented,

“we would have been involved in it (the industry organisation) from the start because we play an active part in the association. So the likes of myself would have been on committees and so on yeah and providing information and trying to fight for the changes you know. So I believe that we should play an active part in that. Some others don’t. They think that we do all that and all it does if benefit the opposition. My view to that is the same as training. Some people say oh you provide training and then people go and work somewhere else. But I don’t have that view. I think we should do everything we can to improve the industry. If the industry is better and we are a key player we must benefit.”

Observing Firm P’s growth trajectory, these benefits have contributed to sustainable firm growth (see case study of Firm P). Adaptations which illustrate evidence of a firm’s dynamic capabilities such as Firm H utilising its entrepreneurial resource to appropriate control over a key regulatory requirement, in this case, the Resource Management Act (1991) and the Employment Health and

Safety Act (1992). The managing director of Firm H commented about this implementation after 2008,

“we’ll use our fulltime staff to do company’s health and safety inductions like we’ve always said, look we don’t expect you to guarantee us any work, let us do your health and safety induction, we’ll get the qualifications and if your service provider, current one, is not available then at least you’ve got a viable back up and you don’t have to then think you delay the project and so our guys will have the right site induction, they’ll have the work authority to keep everything else in place.”

The intention to achieve the goal of implementing these systems for a particular energy producer is summarised by the managing director suggesting that this company was, “definitely in our target market.” With the intentionality clear, the evolutionary fitness test can be applied to see whether the implementation of this process creates, extends or modifies resources. In this case, Firm H exhibits the ability to seize the opportunity to create an appropriability regime, a key dynamic capabilities process of “selecting enterprise boundaries to manage complements and ‘control’ platforms” (Teece, 2009, p. 35).

A further example of how the regulatory environment can present an opportunity to a suitably alert and capable business is Firm L. The managing director of Firm L commented that “a lot of regulatory issues are making them (customers) spend money and when I say regulatory issues it’s the tankers coming out of service and they all know that those five tanks we’ve just managed to keep them rolling over and now we are having to spend some money on them”, “which has been great for us.”

4.6 Discussion.

The influence of global factors, whether it be commodity prices dictating investment cycles, international legislation or political events, have an effect on New Zealand’s regional and local energy industry. Changes in the economic environment are not easily predicted nor can they be controlled by the firms considered in this thesis. Yet they are all influenced by these changes. It is apparent from the 15 SME case studies that energy industry investment developments are accompanied by the development of engineering skills. The New Zealand Energy Strategy 2011-2021 (MED {MBIE}, 2011a) mentions that “our hydro and geothermal developments are amongst the country’s greatest engineering achievements” (p. 2). Hyperbole or not, the fact is that these plants, pipelines, storage facilities and other associated infrastructure were or will be built with contribution from local engineering firms, many of them local SMEs (OECD definition). With the industry contributing significantly to New Zealand’s export revenues, analysis of how the SME operating in this industry

can grow sustainably would further add to New Zealand's export revenues as the Danish example mentioned above would suggest they could.

Throughout the course of the interviews and market research it has become evident that the wider (global) industry factors have a direct effect on the growth opportunities and threats of New Zealand SMEs. Firm O's managing director commented, "look the problem with this industry is that, as I say the same drivers affect everybody so if you know the oil price drops and everyone shuts their wallets." This is not necessarily a passive effect as further evidence of the multinational firms' purposefully having an effect on the growth of SMEs is apparent. For example, Firm L's managing director commented,

"I thought I'll contract to the oil companies because they'll never go broke. They operate (like a) Cartel, they dictate the terms."

Firm O's managing director further confirms this, when a large multinational oil firm called in all its contractors just after the Asian Crisis (2000) hit, by saying,

"sorry we're not spending any money and don't know what you guys are going to do, but... you know, you're on your own. Thanks."

The engineering firms in the case studies are reliant on investment in the energy sector for market led growth opportunities, like the index presented in Figure 4.1 – the importation of steel pipe associated with the oil and gas industry. When charted with the (internationally dependent) oil and petrol price importation price to New Zealand, Figure 4.1 reveals a corresponding link between investment in the New Zealand oil and gas industry and the imported oil price. Whilst this link is not necessarily surprising, it is the curve of which provides some insight to the effect of the growth in several firms which derive a large part of their revenue from investment in the industry. Furthermore, economists link the investment in the industry to the international oil price (Australian Government Department of Industry, 14 December 2014). The growth curves of Firms A, D, E, F, G, K, N and P also exhibit similar growth curves in the same period 2004-2008. With the exception of Firm P all the firms above experienced a subsequent downturn in growth about the same time (2010) as Figure 4.4 illustrates.

Whilst this is not the primary objective of this study, it is interesting to segue firm size with resilience to downturns in the industry. Firm P's case study reveals it grew phenomenally over a period of 20 years and currently employs approximately 1200 staff. It too is dependent on the investment in the industry. Whilst it did experience a small downturn at the same time as the firms mentioned above, Firm P's case study reveals that the firm had the ability to diversify and establish a stronger growth curve than before. The same phenomenon has been observed where larger New Zealand firms have had better resources to weather downturns and end up in a stronger position than before (Green &

Agarwal, 2011). Yet firm E, an SME, also manages to do the same. This study aims to shed light into how these firms (and others) were able to grow despite being exposed to external threats.

Setting this study within a defined context, the New Zealand energy industry, as (Helfat et al, 2007) suggest, removes the question of the conditions under which the cases studies are analysed with the same framework (Bhaskar, 2008). The use of a constant context is also remove any external influence on the case studies (Bandara, Gable, & Rosemann, 2005).

5.1 Introduction.

The motivation to undertake this study stemmed from observed phenomena of firm growth performance amongst engineering firms in the New Zealand energy industry. The phenomena observed are illustrated in the growth curves of the unit of analysis: the firm. The reason for the selection of industry is twofold. One is that it is an industry the researcher is interested in and secondly it forms a constant context. A qualitative research method is chosen to understand how dynamic capabilities influence firm growth. Understanding dynamic capabilities of a firm is context dependent (Helfat et al, 2007). As this context is best interpreted through a reality projected by human entities a subjective phenomenological research process is required (Morgan & Smircich, 1980). This means that the measurable elements are best observed by personal interaction and interpretation. The measuring is undertaken through the use of an operationalised framework or model, which when multiple cases are analysed, extends this to “readily adapted and tested within other modelling domains” (Bandara et al, 2005, p. 358).

Further supporting the qualitative research approach is the nature of the real world relationship (Yin, 2010), between a firm’s dynamic capabilities and firm growth as the non-tradable knowledge related assets (Teece, 2009), which are best observed in the form of processes (Bingham et al, 2007; Narayanan et al, 2009) and activities (Siggelkow, 2001) and are not immediately measurable. As Garnsey et al (2006) suggest;

“Without observations at the firm level, the mechanisms and processes of growth remain obscure” (p. 3).

A dynamic capability process based analytical methodology would therefore be the most appropriate path to take. The problem is, this has not yet been developed. This thesis charts a mechanism with which to identify and measure specific firm processes for evolutionary fitness to establish if they meet the dynamic capabilities’ threshold at a particular inflection point along their growth trajectory. Data are gathered primarily through semi-structured interviews and subsequently interpreted to deliver insights (Yin, 2010) into how dynamic capabilities influence firm growth. This chapter further builds on the research philosophy, details the research design and outlines the sampling frame. In all, fifteen engineering SMEs operating in the New Zealand energy industry were considered along with a major listed energy firm and several industry organisations thus providing the necessary insight to understand a firm’s internal capability processes (King & Horrocks, 2010).

To ensure an objective and substantive resource for analysis is available, the data collection methods are described in accordance with Yin (2010) and Eisenhardt's (1989) case study methodology. The mechanism of coding is detailed with which to analyse the data. The process of validating and ensuring the reliability of this data is described.

Finally, limitations of this research are identified and described. The contribution of this research is to respond to the calls of Hine et al (2013), Pitelis (2002), Helfat et al (2007) and Teece (2009) to better understand the relationship between dynamic capabilities and growth. In order to develop this understanding, the research questions 1 to 4, articulated in Chapter 3, achieve this by examining processes associated with key dynamic capabilities skills. To reiterate, the research questions are:

- *RQ 1: How do sensing capabilities influence firm growth?*
- *RQ 2: How do seizing capabilities influence firm growth?*
- *RQ 3: How do transformational capabilities influence firm growth?*
- *RQ 4: How does the renewal of dynamic capabilities influence firm growth?*

5.1.1 Research philosophy.

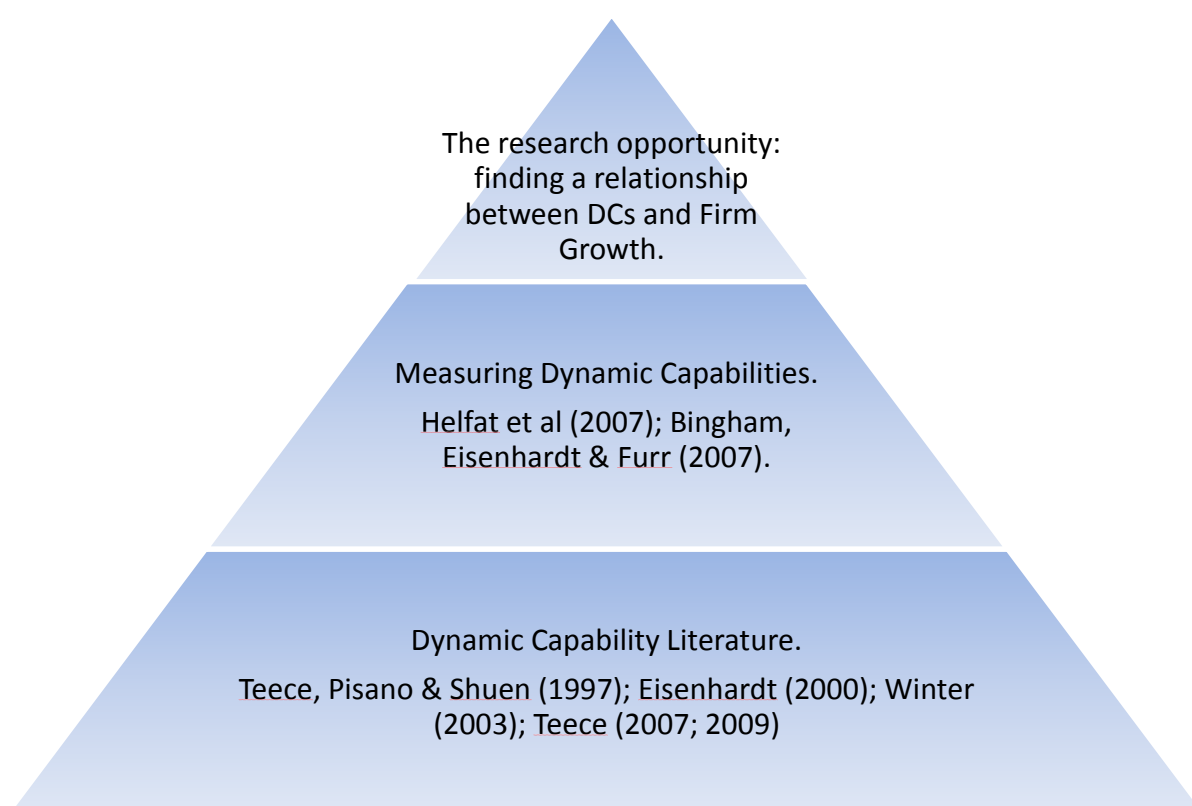
Because the nature of data collection implies a subjective discourse, an interpretation mechanism is required. A critical realist perspective that suggests "the world exists independently of our knowledge of it" (Sayer, 1992, p. 5) is adopted. Although it is differentiated and stratified with events, mechanisms, and objects including structures causing it to change, it can be observed, but only imperfectly (Bhaskar, 2008; Denzin and Lincoln, 2005; Sayer, 1992). The value of discovery lies in being able to explain and interpret this imperfect reality. This is especially important when observing phenomena which may be influenced by unobservable factors. A research validation process contributes to an understanding of how these factors influence the phenomena. The observation and validation process benefits the qualitative research in the process domain, where the processes are people driven.

Furthermore, when the core ontological assumption is a reality projected by human entities, a subjective phenomenological research process is required (Morgan & Smircich, 1980). This means that the measurable elements are best observed by personal interaction and interpretation. Further supporting the qualitative research approach is the nature of the real world relationship (Yin, 2010) between a firm's dynamic capabilities and firm growth. This is because the non-tradable knowledge

related assets (Teece, 2009) are best observed in the form of processes (Bingham et al, 2007) and are not immediately measurable.

Semi-structured interview interaction and the subsequent interpretation of the resulting data delivers insights (Yin, 2010) into how dynamic capabilities are associated with firm growth. The concept of dynamic capabilities as indicated in Figure 5.1 illustrates the nascent nature of the proposed research. Nascent theory research requires questions about how a process works to illuminate gaps in existing theory (Edmondson & McManus, 2007).

Figure 5.1 - The research opportunity.



In contrast, the use of quantitative methods offers a rather static view of phenomena. This approach does not capture the why and how of the mechanisms or processes that underlay dynamic capabilities. Penrose (2009 (1959), p. 1) opens her introduction to *The theory of the growth of the firm* by suggesting that firm growth, “is used in its primary meaning implying an increase in size”, “as a result of a process of development.”

This “process of development” to realise a sustained “productive opportunity” (Penrose, 2009 (1959), p. 28) of the firm is able to be understood through the dynamic capabilities framework. In a

continuously changing business environment, firms seeking success must “continuously create, extend, upgrade, protect, and keep relevant the enterprise’s unique asset base” (Teece, 2009, p. 4). Therefore a search for static phenomena is not going to satisfy the research questions centring on how dynamic processes contribute to firm growth. Rather a process approach is required.

In their paper on the effects of organisational capabilities and SME growth, Uhlaner et al (2013) acknowledge that a quantitative study is limited in this regard as it lacks depth. Case studies add detail and depth to theory building (Eisenhardt & Graebner, 2007). In fact, “the deep connection between dynamic capabilities and organisational process research has not been adequately appreciated” (Helfat et al, 2007, p. 36). In addition, Helfat et al (2007, p. 36) suggest, “research in the process domain makes greater use of interviews and surveys”, “to collect and analyse primary, often qualitative data”. Moreover, multiple data collection mechanisms contribute to the validity of this type of enquiry as explained below.

5.1.2 Research design.

The research design is required “to elucidate the process of research and knowledge production.” (Deetz, 2009, p. 25). Bhaskar's (2008) critical realist stance suggests the research design must support a “philosophical ontology” that “asks what the world must be like for science to be possible;” (p. 26). In a search for the meaning of firm phenomena qualitative methods are required (Daft, 1983; Yin, 2010).

For data from this search to contribute to theory generation, multiple case studies are suggested to control variations outside of the researcher’s control and enable generalisations to be made (Eisenhardt, 1989). Importantly, case studies will increase the depth of understanding of dynamic capabilities (Helfat et al, 2007)). The data collection method is explained below. Triangulation is suggested as an accompanying strategy to lend credibility to the data and mitigate threats to the validity of the research (Edmondson & McManus, 2007; Yin, 2010). This method is consistent with the research of Aramand & Valliere (2012); Evers et al (2012); Kuuluvainen (2012); Schlemmer & Webb (2008) as discussed in 3.3 above.

5.1.3 Research sampling frame.

This research is primarily interested in the capacity of a New Zealand firm’s growth options within a particular industry. Of particular interest is the industry and type of firms that are important to the New Zealand economy and which may operate in domestic or international markets, where the

markets do not limit growth (Penrose, 2009 (1959)). As the motivation to conduct this study is to develop a meaningful theory of firm growth, it must be the firm that is the unit of analysis (Chandler, 1992). Based on these criteria, fifteen engineering SMEs of varying sizes operating in the energy industry are selected as case study businesses. This “population” of cases should enable generalisations within the industry subset (energy engineering firms) to be made (Eisenhardt, 1989). Furthermore, this number is sufficient to provide necessary insight required (King & Horrocks, 2010) for understanding a firm’s internal capabilities.

To produce greater information to answer the research questions and shed new light on the dynamic capabilities framework a purposive “maximum-variation” selection strategy is adopted (Flyvbjerg, 2011, p. 307). This involves the selection of cases that differ on one dimension, possibly: growth performance.

For this study to contribute to New Zealand’s future growth prospects, these firms need to fit the criteria of being an SME (Dobbs & Hamilton, 2007) that is, having 250 full time employees or less (Organisation of Economic Cooperative Development, 2004). The choice of firm size is not solely because SMEs are ideal to study, but also to exclude larger multinational firms operating in New Zealand. To ensure that the study examines firms which have the capacity to contribute to the study through their internal dynamics, they must also not be zero-employee firms (Mills & Timmins, 2004). For the purposes of answering how dynamic capabilities are associated with firm growth, the micro-level of analysis is associated with the processes supporting the firm’s key dynamic capabilities skills. The macro-level of analysis is firm growth. Firm growth is measured in a number of ways. As growth is synonymous with an increase in amount (Penrose, 2009 (1959)), the use of changes in amount of sales revenue or FTEs would be an appropriate firm growth measure. Considering the firms analysed are private and sensitive to giving out information relating to performance measures, other methods must be considered. Change in profitability or full time employees (FTEs) are some options. Profitability can be fraught with accounting nuances (Helfat et al, 2007) and the FTE approach could be distorted by such activities as outsourcing and sub-contracting, something observed to occur in the engineering industry. Ultimately the growth of a firm is matter for the shareholders to judge. Hence a question on aspiration to grow and how the firm measures growth is included in the interview and thence an appropriate (and available) measurement is applied. Interestingly, some of the cases view geographic reach and product offering as ways to measure growth. This performance measure is consistent with the *Hercules* case study and subsequent analysis (Kay, 2002; Penrose, 1960).

Selection of subject firms began with a profile of typical firms in the above described category and included some firms with international sales (as a growth mechanism). Information for this profile

was collected from publically available information. Nonetheless, it is change in growth which is able to form the measurable dimension of the case study firms. Firms were selected a priori based upon industry knowledge, references, New Zealand’s geographic location, mix of size and perceived growth. As expected, after the interview/s, secondary data investigation and subsequent case analysis, the a priori perceptions of performance were not always fulfilled, such as when Firm I divested assets and personnel (reduced in size) to release capital to pursue an internal “productive opportunity” and thence improve profitability.

The term “manager” is often used to describe the person responsible for effecting the strategy of the firm (Augier & Teece, 2008; Augier & Teece, 2009; Greiner & Bhambri, 1989; Penrose, 2009 (1959)) and is equally used alongside “entrepreneur” and “leader”. The selection of these interviewees, who were sufficiently senior, to support the veracity of the data (Cassell, 2009), were the persons responsible for controlling the strategic aspects of the firm (Zahra et al, 2006).

In order to ensure that a quantity of data is substantial enough to examine the role of dynamic capabilities play in firm growth, Yin’s (2010) purposive sampling approach is taken. The comparative logic approach (Eisenhardt, 1991) enabled better analysis of whether dynamic capabilities influence firm growth. This approach is summarised in the preliminary sampling framework illustrated in Table 5.1. As is evident in this thesis, this simplified a priori approach had to be modified as part of the “disassembly”, “reassembly” process as per Figure 5.2 once the case study analysis commenced. The categories are rough splits based upon post interview sizes and growth trajectories, prior to analysis. As Chapter 6 and 7 details, the growth categories are re-evaluated as there are nuances uncovered when analysing the sustainability of their growth trajectories. Growth in revenue or FTEs are not blindly used as a performance measure when analysing dynamic capabilities’ effect on “the persistence of growth”, but improvement in profitability too, that can “reveal the extent to which firms can sustain their evolutionary fitness” (Helfat et al, 2007, 103).

Table 5.1 - Sampling framework.

	Smaller SME	Larger SME
High growth	3 SMEs (Firms B, K, F)	3 SMEs (Firms E, O, P)
Low growth	3 SMEs (Firms M, J, N)	3 SMEs (Firms I, G, L)

Firms approached (and committed to be interviewed) on the basis that they fitted broadly into the quadrants in Table 5.1 are indicated. The full list of firms and organisations interviewed are

summarised in Table 5.2. Whilst this framework was established prior to the field research being undertaken, the firms targeted for research appeared to fit into one of these four quadrants. More than the twelve firms indicated were approached in order to satisfy the requirement to replicate logic (Eisenhardt & Graebner, 2007) until saturation of data is observed (King & Horrocks, 2010).

This number satisfies the requirement for the insight required to understand a firm's internal capability processes (King & Horrocks, 2010) without experiencing saturation of data. This became evident towards the twelfth, thirteenth, and fourteenth interviews where the interviewees' stories exhibited a common theme dependent on their stage of growth. For example, Firms B and H, both similar sizes and growing steadily, had the same approach to branding with the managing director of Firm B commenting,

“driving along the motorway you’ll pass 15 different contractors in their little trucks, at least, 15, 20, 30 on the motorway with their guys going somewhere and how often do you see one of those trucks with anything written on them, probably 30% maybe. The other guys, no one knows who the hell they are and yet that business owner somewhere he must want work, he must be relying on work in some regard.”

The managing director of Firm H has the same opinion,

“really from about 2004 onwards as well we’ve been heavily into branding. We have a very distinctive brand, it’s bright, it’s bold, it’s simple and it’s I mean it’s consistent across all of our media whether it’s vehicles, business cards, letter head whatever and so I think just time in the market that started to be recognised.”

Similarly, Firms J and M had similar responses when asked about their business plans; “it still should be in the cupboard down there somewhere” to “no”! Not surprisingly, both these firms' growth curves looked flat and profitability was in decline.

To utilise the yardstick approach, firms are grouped into those exhibiting unsustainable growth and sustainable growth. Growth is measured a number of ways, full time employees, profitability, assets and geographic reach to name a few (Delmar et al, 2003; Helfat et al, 2007). In many cases interviewees (CEOs, managing directors and general managers) were comfortable sharing employee numbers and a few were comfortable sharing financial information. Both these measurement units are utilised as the case analyses are all context dependent.

As mentioned above, the motivation to undertake this research was gained from observing various growth activities undertaken by New Zealand engineering firms, operating in the energy industry. The macro context of the analysis is the energy industry. The New Zealand energy industry as described in Chapter 4 forms part of a regional and global market. Growth in this industry is dependent on growth in the investment in the industry and this in turn is dependent on global and

regulatory forces (Figure 4.1). To further understand the industry context, two large firms (C and P) operating in the energy industry were included in the research. Furthermore, three industry organisations were interviewed (Organisations Q, R and S). This proved very useful to form a context with which to understand the industry effects on firm growth.

The constant context is important to maintain objectivity (Collis, 1994; Kuuluvainen, 2012; Loasby, 2010; Peteraf et al, 2013) and as Bhaskar (2008) suggests,

“by constituting an ontology based on the category of experience, as expressed in the concept of the empirical world and mediated by the ideas of the actuality of the causal laws and the ubiquity of constant conjunctions”, “prevents the question of the conditions under which experience is in fact significant in science from being posed” (p. 46).

The case study firms represent SMEs operating in the industry (Table 5.2), and offer a representative data set for analysing the capacity to respond to external threats and opportunities. Organisations Q, R and S in turn offer a triangulation data set for what information the interviewed firms provided.

Table 5.2 – Research interview list.

	Business pseudonym	Industry sector	Geographic market	Title of interviewee	Number of interviews
1	Firm A	Engineering Consulting	Australia, New Zealand, Pacific Islands (PI)	Chief Executive Officer	2
2	Firm B	Engineering Contracting	Auckland	Managing Director	2
3	Firm C	Supplier, Distributor, Technological Leader	Australia, New Zealand	Chief Executive Officer	1
4	Firm D	Engineering Consulting and Supply	Australia, New Zealand, PI ²	Managing Director	2
5	Firm E	Engineering Contracting	Australia, New Zealand, SE Asia	Managing Director	2
6	Firm F	Engineering Fabrication	North Island, New Zealand	Managing Director	2
7	Firm G	Engineering Contracting	New Zealand	General Manager	2
8	Firm H	Engineering Contracting	Australia, New Zealand, PI	Managing Director	1
9	Firm I	Engineering Fabrication	Australia, New Zealand	Chief Executive Officer	1
10	Firm J	Engineering Supply	New Zealand	General Manager	1
11	Firm K	Engineering Consulting	Australia, New Zealand, SE Asia, PI	Managing Director	1
12	Firm L	Engineering Fabrication and Contracting	Global	Managing Director	2
13	Firm M	Engineering Fabrication	New Zealand	Managing Director	1
14	Firm N	Engineering Supply	New Zealand	Managing Director	1
15	Firm O	Engineering Consulting	Australia, New Zealand , SE Asia	Managing Director	1
16	Firm P	Engineering Services	New Zealand, Australia	Managing Director	1
17	Industry Organisation Q	Industry Association	New Zealand	Chief Executive Officer	1
18	Industry Organisation R	Industry Association	New Zealand	Director	1
19	Industry Organisation S	Regional Association	Taranaki	Chief Executive Officer	1

² Pacific Islands, predominantly; The Samoa's, Fiji, Kingdom of Tonga, Tahiti, New Caledonia and Papua New Guinea.

A qualitative data collection method is used. Case study research derives data from phenomena within the real world context (Gibbert et al, 2008), suiting the real world nature of the enquiry. Multiple forms of data were collected such as semi-structured interviews and documents to enhance research validity (Eisenhardt, 1989; Yin, 2010). To facilitate the data collection process, a process was developed and summarised (Appendix A). The case of Firm M mentioned below justifies seeking alternative data for triangulation (Figure 5.2).

An inductive platform is required to examine processes in order to understand capabilities (Yin, 2010). The aim is to build up a broader concept of growth from participant data. Therefore, the primary method of data collection is interviews, an important mechanism to ontologically obtain the participant's viewpoint of reality, especially when they are encouraged with free reign (Bryman & Bell, 2005). The type of interview is semi structured in which open ended questions allow the interviewees to discuss the topic in their own words (Yin, 2010) and utilising the interviewer's empathetic stance to the industry removes the danger of superficial and cautious responses (Alvesson, 2003). This is evident in many of the interviews where the interviewee was comfortable enough to respond with frank and potentially controversial views. The managing director of Firm L for instance derives most of his income from the major oil companies, yet describes them as a "cartel."

The interview guideline (Appendix B) is designed to achieve this without being too prescriptive. The two-way nature of this method of data collection allows an element of flexibility to exist. In several of the interviews, the questions followed the line of discourse that illustrates this free reign. The setting of the interview is important (Cassell, 2009). All the primary interviews were conducted face to face in the environment of the interviewees' choosing. This process involved significant travel around New Zealand and in one case Australia to meet with the interviewees in person. Some follow up interviews, for clarification purposes, were conducted, some in person, others over the phone. The result is the revealing in the example of Firm C that forthcoming legislation presents not only a firm specific, but an industry threat to growth. Furthermore, in the extended discussion later on in the interview, where the interviewee was comfortable sharing some industry knowledge outside of the scope of the interview questions, it was revealed the CEO's attitude to the engineering skill base. He mentions that in product development,

"five per cent of engineers are actually at the entrepreneurial creative end and 95 per cent at the operational and getting that mix of identifying those guys and those entrepreneurial creative guys are the last people you want to execute the project, that's what I found in the consultancy place. We

had 350 engineers and it was very much in the energy sector and then the manufacturing commercial space and again out of that there was probably about five guys that were really creative and entrepreneurial, could go into business, see completely different ways of solving problems but you wouldn't want to leave them running the project because their minds were often how they do something else all the time. So just getting that resourcing lined up is a good lesson."

This insight into how Firm C manages its resources (the skilled engineers) translates into the way the firm manages new product development, which not surprisingly is the fastest growing part of its business as Figure 2.7 illustrated.

The interview shed light on Firm C's recognition that; product development and the commercialisation thereof require different skills. This recognition and subsequent action is a key dynamic capabilities management skill, namely; asset orchestration, one that contributes to a boundary seizing capability. The technological boundaries in this case are modified through intentional innovation to change the "rules of the game" ensuring Firm C has a strategic competitive advantage (Teece, 2007). Whether or not this boundary condition remains, or is sustained will depend on other dynamic capabilities. However the path Firm C is on, by identifying those engineers with the innovation skills and orchestrating these skills towards growth would appear to offer the firm a "productive opportunity."

The staged interview protocol informed by the dynamic capabilities' skills framework guides the interviews. The stages include: thematizing; designing; interviewing itself; transcribing; analysing; verifying and reporting (King & Horrocks, 2010).

Of critical importance is the selection of key interviewees who are relevant to the research question. The key person is the entrepreneur owner, CEO, Managing Director or founder. The approach to identifying the key person, requesting interviews and information for interviews would involve the University of Auckland ethical research guidelines. Subject to the University of Auckland research ethics committee's approval, the process of identifying and approaching potential interview subjects commenced.

The quality of the data collected depends on the quality of the interview itself. The interviews are to be conducted by the researcher, with experience in both academic and business interviews. For an interview to yield quality data, it requires preparation. A useful guide to preparing for interviews includes being knowledgeable, structured, clear, gentle, sensitive, open, steering, critical, remembering, interpreting, balanced and ethical (Bryman & Bell, 2005).

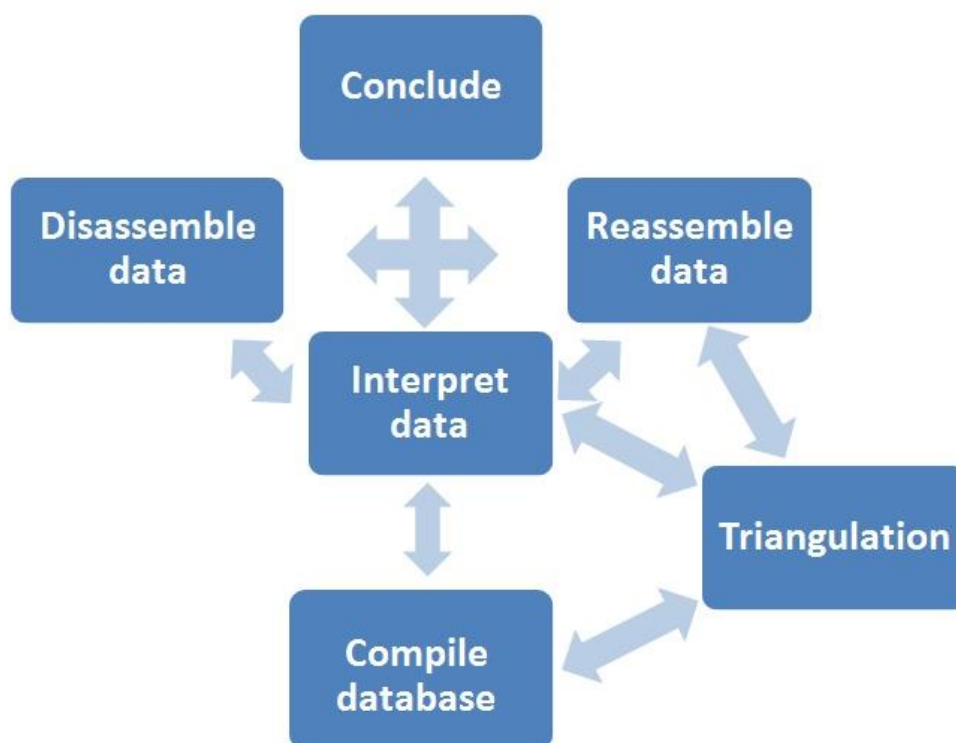
Analysis of primary and secondary data broadly followed the techniques of Yin(2010). A firm's dynamic capabilities are process based and can be sought out by looking for key firm management skills as explained in Chapter 3.4. One of the challenges with qualitative research is the uniqueness of the details in the assembled data (Yin, 2010). The field data, interviews, observations and provided published data all present different interpretations depending on the context. To limit this "informant bias" (Eisenhardt & Graebner, 2007) a coding system is required. The interpretation of data to explain how firm processes are associated with the key organisational skill is possible by using an explanation interpretation method (Yin, 2010).

The process by which the codes were developed included using the dynamic capabilities framework to direct the investigation to address the research questions through structured data analysis. In Firm I's case study, the appointment of a CEO in 2011, reporting to the group's board, where before there was general manager reporting to a group operations manager signalled a change in governance. Similarly in Firm E's case study where in 2010, the managing director acquired a marketing mentor, thereafter the process to establish a board led to a significant change in Firm E's governance structure. Despite these contextually different cases, where Firm I is a manufacturer and Firm E is a service provider, a code relating to the transformational function of a deliberate change in governance would assist in "moving methodically to a slightly higher conceptual level" (Yin, 2010, p. 187).

It is possible to utilise software such as NVIVO to arrange the data. Much thought and advice has been sought in the use of NVIVO. The outcome was a conscious decision to not utilise this as the nuances associated with the interpretation of data gleaned from primary source interviews, secondary sources such as confidentially supplied data, publically available data and observations render the use of a "monolithic" system inferior. Furthermore, the language and interpretation thereof required an "industrial ear", such as the author possesses to understand the evolutionary fit criteria as mentioned above.

The analysis included retroduction logic (Eisenhardt, 1989; Miles & Huberman, 1994; Sayer, 1992). Retroduction is the "mode of inference in which events are explained by postulating (and identifying) mechanisms which are capable of producing them" (Sayer, 1992, p. 107). The identification process requires a triangulation step to ensure the veracity of the data. To illustrate how the triangulation stage fits in with the stages of analysis, a modified version of Yin's (2010) 5 phase approach has been constructed (Figure 5.2).

Figure 5.2 - Five phases of qualitative data analysis and Interactions based on Yin (2010, p. 178).



Interpretation only after a thorough disassembling and reassembling stage verified with a triangulation process is then possible to arrive at a reliable set of data. The process of disassembling and reassembling data is useful prior to interpreting as this is when the yardstick approach can be applied. In the case study building process, interview data, field notes (examples in Appendix C), observed data and publications were regarded as primary data. All primary data were gathered prior to disassembling and then reassembling in case study form. Chapter 6 details some of these. Testing and measuring of data was followed by coding, and sorting them into bundles. The triangulation (or validation) process was undertaken between the data interpreting and concluding stages.

The testing of the data was done through testing the process for evolutionary fitness (Helfat et al, 2007). With dynamic capabilities being context dependent (Helfat et al, 2007) if we can set the context as the growth of engineering firms in the New Zealand energy industry, the evolutionary fitness can be the “yardstick” by which the dynamic capability was measured. The test applied to the data is where the “dynamic capability enables an organisation to make a living by creating, extending or modifying its resource base”, (Helfat et al, 2007, p. 4).

An a priori theory such as used here is useful to focus the investigation yet leaves the investigator open to discovering new patterns within the investigative framework (Weston et al, 2001). Care must be taken when constructing plausible explanations as they must be supported by the data. The process of “analytical generalisation” (Gibbert et al, 2008) refers to the process of developing empirical observations to theory. Triangulating the primary data with the firm’s data, information

from publically available sources, secondary interviews and possibly survey's such as the Growing New Zealand Business Survey (Growing New Zealand Business {GNZB}, 2011) provides an opportunity to set the scene and juxtapose this study. Organisations Q, R and S were added to the interview list for such a purpose (Table 5.2). The objective of this triangulation data analysis is to support (or not) the process links to key dynamic capabilities skills. The CEO of Organisation Q commented "we have a responsibility to help our members to develop their businesses to grow." One of the key sensing capabilities is the firm's ability to engage with external organisations and complementors such as Organisation Q. Firms such as Firm P which purposefully (and strategically) had involvement with its industry association were able to not only stay up to date with industry developments, but also influence standards and codes of conduct to benefit the industry and as the managing director says of his involvement in his industry association, "if the industry is better and we are a key player we must benefit."

This approach satisfies the robustness of the research as Helfat et al (2007) suggest "the core concept (of Dynamic Capabilities) requires clarification and development of the conceptual underpinnings along with grounding in empirical observation" (p. 1). Practically, the focus of the search for the evolutionary fitness indicators can be centred on seeking those processes or activities which alter the status quo of the firm (Hine et al, 2013). When utilising a "yardstick", the hierarchy of the activity can also be established due to the degree of "strategic intent" allocated to these activities, like the purposeful involvement by Firm P in its industry organisation as described above. In summary, a process which meets the criteria of creating, extending and modifying a firm's resource base as a result of a strategic intent and which altered the firm's status quo, in this case growth is an evolutionary fit process. This evolutionary fit process is then associated with a particular dynamic capability.

It is this yardstick approach (Helfat et al, 2007; Teece, 2009) that enables the data to be interpreted and sorted in a systematic format (Evers et al, 2012). Using the evolutionary fitness test of the process is established (section 3.3), it is possible to explain the fitness of the particular dynamic capabilities skill type. This explanation addresses the hypotheses summarised above. Data are presented in a familiar format (Table 5.3), adapted from Evers et al (2012). Appendix D presents the analysed data from the case studies in this format.

Table 5.3: Case data presentation summary table adapted from Evers et al (2012, p. 54).

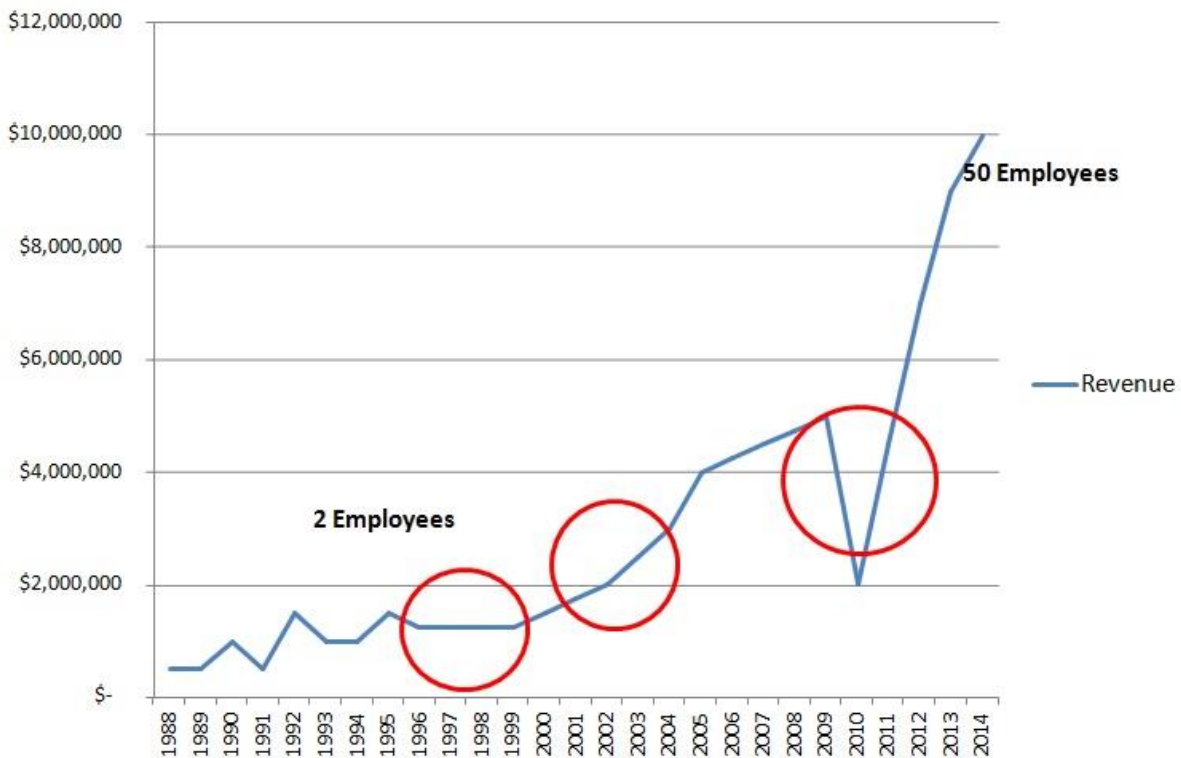
Case #							
Code (addressing RQ)	Year Implemented	Data source ³	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 1959; Kay, 2002)	Growth Outcome

³ Interview, document, 3rd party, observation, public source.

In order to analyse the data, coding was prepared. Guided by a coding generating method such as described by (Weston et al, 2001), codes have been generated in accordance with the sensing, seizing and transforming dynamic capability framework. Table 5.4, 5.5 and 5.6 develop Tables 3.1, 3.2 and 3.3, the sensing, seizing and transforming capabilities, to illustrate the coding system designed for data analysis dynamic capabilities. The data were analysed in accordance with the processes associated with dynamic capabilities, in particular the micro-foundations as discussed in Chapter 3. Teece (2009, p. 107) provides guidance on which processes to look for, namely “distinctive processes (which) support the creation, protection, and augmentation of firm-specific assets and competencies.” These processes are “distinctive ways of doing things inside firms.” Firm I recognised a growth opportunity within its market base which the firm was able to capture through investment in technology. Firm I worked with its key suppliers to develop a production line rendering it a strategic operational advantage in its geographic market. It is not so much the new technology that is evidence of a dynamic capability, but the “unique process” the firm undertook to engage with its suppliers to establish the production line, which in turn established a strategic competitive advantage. In this case, in 2011, there is evidence that the firm has sensing and seizing capabilities, namely the ability to use complementors for market knowledge and innovation, and thence establish strong firm decision making protocols and firm boundaries.

These capabilities may not necessarily be implemented and take effect immediately (Helfat & Winter, 2011) as Firm E’s third period of transformative dynamic capabilities illustrates (Figure 5.3). In this case the ability of the firm to transform some key resources took approximately 2-3 years. In that period, from 2010 to 2013, the firm was able to transform its business model, governance structure, acquire a marketing mentorship capability and a strong financial resource. Despite the longer time frame than otherwise observed in other firms, Firm E exhibited sensing, seizing and transformative dynamic capabilities.

Figure 5.3 – Firm E’s growth trajectory illustrating 3 periods where dynamic capabilities were evident.



The observation of the regular nature of Firm E’s implementation of dynamic capabilities processes opens up the question of whether Firm E recognised existing dynamic capabilities routines were no longer delivering the firm a strategic advantage and were able to renew them. The question of whether dynamic capabilities’ renewal processes have an influence on firm growth is the fourth research question. Analysis of data for this purpose is done from the existing codes and examining their “regularities” (Helfat & Peteraf, 2003) and their growth trajectories.

Table 5.4 – Sensing Capabilities Coded (developed from Table 3.1).

Dynamic Capability	Foundations	Micro-foundations	Research Question	CODE
				Developed in line with (Weston et al, 2001)
SENSING	Analytical systems (and individual capabilities) to learn and to sense, filter, shape, and calibrate opportunities	Processes to direct internal R&D and select new technologies	RQ1	SENSSTRATR&D
		Processes to acquire supplier and complementor innovation Processes to tap developments in exogenous science and technology	RQ1	SENSEXTR&D
		Processes to identify target market segments, changing customer needs and customer innovation	RQ1	SENSMKTR&D

Table 5.5 – Seizing Capabilities Coded (developed from Table 3.2).

				CODE
Dynamic Capability	Foundations	Micro-foundations	Research Question	Developed in line with (Weston et al, 2001)
SEIZING	Enterprise structures, procedures, designs, and incentives for seizing opportunities	Delineating the customer solution and the business model	RQ2	SEIZBUSMODEL
		Selecting decision-making protocols	RQ2	SEIZDECISION
		Selecting enterprise boundaries to manage complements and "control" platforms	RQ2	SEIZBOUNDARIES
		Building loyalty and commitment	RQ2	SEIZLOYAL

Table 5.6 – Transforming Capabilities Coded (developed from Table 3.3).

Dynamic Capability	Foundations	Micro-foundations	Research Question	CODE
				Developed in line with (Weston et al, 2001)
MANAGING THREATS/ TRANSFORMING	Continuous alignment and realignment of specific tangible and intangible assets	Decentralization and near decomposability	RQ3	TRANSDCENTRAL
		Governance	RQ3	TRANSGOV
		Cospecialization	RQ3	TRANSCOSPEC
		Knowledge management	RQ3	TRANSKNOWL

The case studies are constructed charting the growth of the firm. This process includes identifying points along the firm's growth curve (trajectory) where it changes slope or where points of interest are evident. These "inflection points" are then analysed for a change in processes. The semi-structured interview data gathering allows questions to centre on these points and is aimed at discovering the key processes implemented at a key point in a firm's growth curve. The questions are not designed to find a causal relationship but only to seek meaning. A concern raised by Helfat & Winter (2011) when researching the division between dynamic capabilities and operational capabilities is one of bias. Case study methods reduce the risk of a cognitive bias (Eisenhardt, 1991). Questions centred on the key dynamic capabilities skills are expected to reveal when these key processes were implemented. Only once the case studies are prepared are they analysed.

In developing the case studies, the process of assembling the data is undertaken (Figure 5.2), allowing the data to then be interpreted. Following this interpretation, it is necessary to ensure that the research process is valid and reliable.

5.4 Validity and reliability framework.

For case study research and collected data to be reliable, a rigorous regime of validation is required (Eisenhardt, 1991). The underlying validation process is multi-faceted. (Yin, 2010) points out possible mechanisms to help ensure validity of case study research, such as triangulation. There is a way to achieve a real world interpretation of data by triangulating with firm data, historical and otherwise (Edmondson & McManus, 2007; Yin, 2010). Triangulation is able to support or discredit interview data and enable concept development. Selection of reference points to corroborate facts gleaned from interviews includes historical revenue, employment and process evidence.

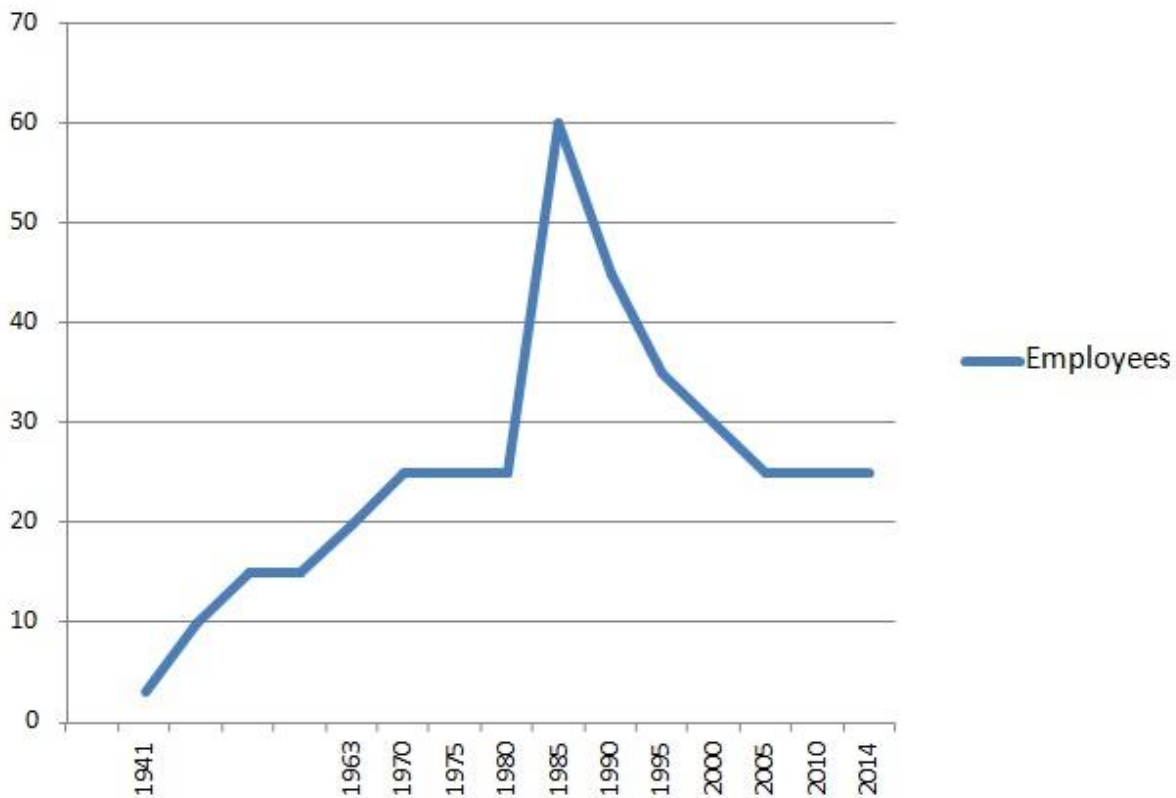
Triangulation (or validation of data) was proven to be important between the interpreting and coding stages as the case of Firm M shows. During interview stage, the managing director described his business as having grown as per Figure 5.4. The field notes included a section where this growth trajectory was summarised throughout the interview (Appendix B).

Figure 5.4 – Firm M’s growth trajectory prior to the triangulation process.



After the interview, the managing director offered a dated brochure for interest’s sake. In this brochure, prepared in 2005, under the section “Personnel”, there is a statement that in 1985 when Firm M’s main opposition closed down, Firm M, “acquired many of the redundant staff”, and that “the company is trading more profitably than at the time when [Firm M – Redacted] employed 60 and more.” Using this information and going back to Firm M to confirm this as the case, the managing director replied “oh yeah.” The growth trajectory of Firm M was then modified as per Figure 5.5.

Figure 5.5 – Modified Firm M growth trajectory after data verification.



It is the methodological rigour from research question development to theory building and testing that contributes to the formation of powerful theory (Eisenhardt, 1991). The systematic criteria to enhance rigour (Gibbert et al, 2008) in data collection is not adequately addressed by Yin (2010). Rigour is enhanced by establishing a research protocol from planning stage to reporting stage (King & Horrocks, 2010). It is this protocol that must include the plan to ensure validity and reliability of the research. Gibbert et al (2008) detail the criteria to assess this form of field research. The criteria include internal validity, construct validity, external validity and reliability of the data collected. To prevent amplified errors or loose research, this series of criteria aim to maintain the discipline of rigor throughout the various phases of case research. This research follows the Gibbert et al (2008, p.1467) framework for investigation the methodological rigor of case studies. This is illustrated in Table 5.7 below.

Table 5.7: Validity and reliability. Source: Adapted from Gibbert, Ruigrok, and Wicki (2008, p.1467).

Internal validity	Construct Validity	External Validity	Reliability
		(Cook & Campbell, 1979)	
Research Framework.	Data triangulation Interview primary data collected from 12 firm's CEOs, founders, or entrepreneurs.	Cross-case analysis A cross-cases analysis involving 12 different case study businesses to be undertaken. Further case studies may be used to inform the findings.	Case study transparency to be undertaken through the established protocol (King and Horrocks, 2010) with this detailed in the final thesis.
Explicitly derived from Teece's (2009) dynamic capabilities framework, Helfat et al's (2007) dynamic capability evolutionary fit and Penrose's (1959) growth theory literature.	On-site visits to the businesses to be undertaken. Documented contribution from observation of business operations, engagement with staff.	Case study method selection arrived at through the nature of the questions being asked. Questions consistent with Teece's (1997, 2007, 2009) DC theory, Helfat et al's (2007) mechanisms of analysis, including the yardstick approach. DC's manifested as processes, and enquiry into internal firm processes, a nascent theory, requires case studies (Bingham, Eisenhardt and Furr, 2007).	A digital case study database will be created and used to hold digitized copies of all literature, consent forms, interview protocols including field notes, recordings, transcripts, secondary documents, other research notes, narratives and other analysis documents.
Empirically observed patterns compared with patterns from the Teece (2009) and Helfat et al (2007) framework.	Secondary data collected - websites, news media, magazine articles, documentaries, company planning reports, annual reports, financial accounts, and industry reports.	Cases selected from companies within the New Zealand resources sector, to establish how dynamic capabilities affect firm growth, are expected to contribute to New Zealand's economic performance.	
Theory triangulation – Practical examples of evident in Schlemmer and Webb (2008); Aramand and Valliere (2012); Kuuluvainen (2012) and Evers, Andersson and Hannibal (2012). Yin (2010) provides the theory and Helfat et al (2007) provide the mechanism for validating primary data.	Chain of evidence.	In particular, engineering firms, New Zealand owned and operating in an industry identified as having long term growth opportunities. This represents a growth opportunity for such firms. The questions relate to how these firms realize this opportunity through internal productive mechanisms.	
	Interview protocol designed in interview guide. Designed to address the particular processes associated with dynamic capability skill types. Peer reviewed and tested with primary interviewees before use.	The firms to be selected are SMEs at a regional if not global level, so exclude large multinationals.	

Yin (2010) and Eisenhardt (1989).

Primary interviewees of the case study businesses provided on-site access to data. Data from public domain also collected.

Field journal used for secondary data collection during selection, interviews, and post interview.

Quotes used from the transcripts of audio recordings to be verified with interviewees.

Data analysis involved compiling, disassembling, reassembling, and interpretation.

Firm growth performance is measured as sales revenue growth (Helfat et al, 2007).

5.5 Presenting the data for analysis.

Visualisation is useful when presenting complex data sets,

“the real voyage of discovery consists not in seeking new landscapes but in having new eyes” (Asmal, Chidester, & James, 2004, p. 183).

The use of tables and graphs (visual aids) “emphasises the rigor and depth of the empirical grounding of the theory” (Eisenhardt & Graebner, 2007, p. 29). Graphs such as Firm E’s growth trajectory in Figure 5.6 establish the empirical context of the unit of analysis, the firm. A summary of the case studies (Chapter 6) culminates in the use of tables in the format of the Table 5.3 template.

The crafting of the case studies along with the tables establishes the “richness of case data”, which ties the “tables clearly to the text” (Eisenhardt & Graebner, 2007, p. 29). Dynamic capabilities processes associated with the key management skills were examined at inflection points on a firm’s growth curve. Sensing capabilities are only considered as being derived from learning and knowledge management skills as “sensing new opportunities is very much a scanning, creation, learning, and interpretive activity” (Teece, 2009, p. 9). The dynamic capabilities skill sets and their subsequent associated dynamic capabilities exhibited by the firm at the firm’s growth inflection point are summarised in tables (Table 5.8).

Table 5.8 – Dynamic capabilities summary at the firm growth inflection point.

	Year		
	Sense	Seize	Transform
Learning and knowledge skills			
Governance skills			
Business design skills			
Investment allocation skills			
Asset orchestration skills			
Growth outcome			

With the data analysis (Table 5.3) summarised in the format of Table 5.8, the visual aid is able to be correlated with the case analysis. In Firm H’s case, the populated Table 5.3 format is illustrated in Table 5.9. The full set of firm dynamic capabilities summaries are found in Appendix D. This is able then to be summarised in the format of Table 5.8 as Table 5.10 illustrates. The graphical summary is then superimposed on Firm H’s growth trajectory as Figure 5.6 illustrates, offering an opportunity to see the data with “new eyes.”

Table 5.9 – The populated Table 5.3, case data presentation for Firm H.

Code (addressing RQ)	Year Implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSSTRATR&D RQ1SENSEXTR&D RQ1SENSMKTR&D	2002	Interview, observation.	Learning and knowledge management.	Analytical systems (and individual capabilities) to learn, sense, shape and calibrate opportunities.	Strategic intent include how the firm learns internally and externally, collaborates, reviews and adopts technological innovation and has a highly developed ability to sense the market needs.	Multiple resource linkages, technological bases, market bases, multiple sources of linkages, related-linked expansion, collaborative activity.	Steady firm growth since inception.
RQ2SEIZDECISION RQ2SEIZBOUNDARIES	2002	Interview and observation.	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Selecting decision making protocols.	Important points in the firm’s growth such as the link up with a multinational material supplier were recognised as such and the business changed the way it branded for instance.	Multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Steady firm growth since inception.
RQ2SEIZLOYAL	2002	Interview and publically available information.	Governance, Asset orchestration.	Building loyalty and commitment.	The firm employed permanent staff where the industry relied on contracted staff. Branding was paramount.	Internal influences, response to external threats.	Steady firm growth since inception.
RQ3TRANSDECENTRAL	2002	Interview and observation.	Governance, Business design.	Decentralisation and near decomposability.	The firm has achieved a very flexible yet strong decision making culture.	Internal influences, collaborative activity, divestment.	Steady firm growth since inception.

RQ3TRANSGOV	2002	Interview and observation.	Governance, Business design, Asset orchestration.	Governance.	Uses incentive scheme (full time employment contracts in an industry of contractors), minimises agency issues through the owners operating in the business.	Internal influences, collaborative activity, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Steady firm growth since inception.
RQ3TRANSCOSPEC RQ3TRANSKNOWL	2002	Interview and observation.	Learning and knowledge management, Investment allocation, Asset orchestration.	Co-specialisation and knowledge management.	The firm has aligned assets strategically, coordinated R&D activity. Facilitates internal knowledge transfer, evidence of internal integration of know-how.	Internal influences, collaborative activity, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity, divestment.	Steady firm growth since inception.
RQ2SEIZBUSMODEL	2008	Interview, observation.	Learning and knowledge management, Business design, investment allocation, asset orchestration.	Delineating the customer solution and the business model.	The firm's market demand began to deviate from its core competencies. Firm H spun off a subsidiary to allow it to focus on its strategic plan.	Multiple sources of linkages, market bases, related linked expansion, divestment, shifting cores, internal influences and collaborative activity.	Steady firm growth since inception.

Table 5.10 – Populated dynamic capabilities table at the 2008 firm growth (increased) inflection point.

	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	

The question of the influence of dynamic capabilities renewal on firm growth requires a more visual approach in order to be answered. The dynamic capabilities summarised in Table 5.10 at points along the firm’s growth curve are visually (Eisenhardt & Graebner, 2007) presented (Figure 5.6) in Chapter 7.4. Colours are deliberately chosen (Valdez & Mehrabian, 1994) to best represent dynamic capabilities for ease of interpretation. The applicable dynamic capabilities segments are highlighted at the corresponding growth inflection point against the backdrop of the firm’s predominant industry index as per Figure 5.7.

Figure 5.6 - Dynamic capability representations at inflection points.

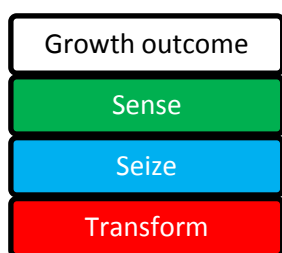
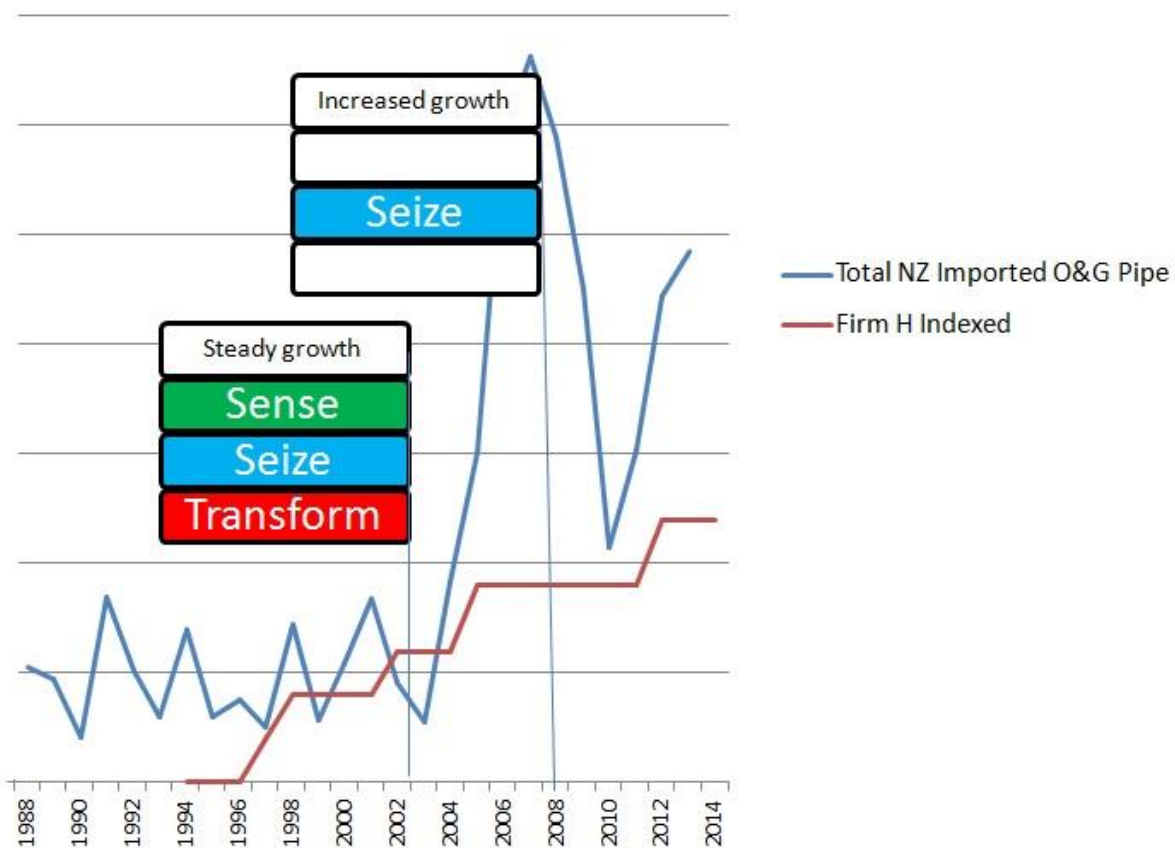


Figure 5.7 – Visual aid combining Firm H’s growth trajectory and dynamic capabilities summary at the inflection points.



Arriving at this point in the case study analysis, the “narrative” has been translated into something “meaningful” (Flyvbjerg, 2011), something which prevents an “over-interpretation” of data. In the research cases data were verified through publications, observation, publically available or provided information. Where there was a disconnect between primary (interview) and secondary data, such as in the case of Firm M mentioned above, the growth trajectory was amended.

From these tools developed in line with Evers et al (2012) and applying the logic of Yin (2010) with the aids of Eisenhardt & Graebner (2007) an objective overview of the impact dynamic capabilities have (or may have) can be established. As logical as this research process is, there is a limit to what the process offers in terms of answering the research questions.

Due to the nature of the enquiry into firms' processes, within an industry with which the researcher is familiar, the study may be subject to the flaw of cognitive bias (Eisenhardt, 1991). Whilst this may have merit when seeking stories from case studies, the research proposed here is more seeking meaning (Daft, 1983; Eisenhardt, 1991). This implies all manner of intuition, senses, embedded in the activities, are used, not just theories in order to find out the truth. In this search for meaning, coupled with a verification process a cognitive bias is reduced. The level of "granularity" required (Helfat & Winter, 2011) to ensure the researcher is honest (and remove bias) about what he observes is able to be maintained by the number of cases examined, verifying the case data through alternative sources and establishing a comparative logic. The manifestation of this "granularity" is in the case study preparation, each case was meticulously written prior to analysis.

Compared to longitudinal studies (Leonard-Barton, 1990) and a single case study such as the *Hercules* study (Penrose, 1960), the case study data accuracy can be questioned. In order to overcome this limitation, this study does contain multiple cases and offers a comparative aspect with a transparency and "methodic-ness" which contributes to the trustworthiness of the research (Yin, 2010). A comparative logic is established by limiting research to engineering firms in the energy sector along with a rigorous case study methodology which in turn strengthens theoretical insights (Eisenhardt, 1991). Confidence in the value of the research is possible with the interviewer having experience of the phenomena about which they write (Daft, 1983).

A validation process (Sayer, 2000) is employed to counter critical realist bias. As unobserved mechanisms possibly influence events it is necessary to keep an open mind when undertaking methods of research. The validation process as described in 5.4 above also helps to underpin the rigor in the critical realist approach as the example of Firm M suggests.

Throughout this thesis the term SME is used to describe the nature of the firm being researched. The definition of an SME being 250 employees or less (Organisation of Economic Cooperative Development, 2004) is used. This could be perceived to be a limitation in terms of applicability to New Zealand or even firms or economies further afield. However, this limit is used to exclude larger multinationals rather than solely include micro businesses in New Zealand. As many of the case study firms operate in a globally competitive industry (including competing with global competitors domestically), the application of this definition of SME is relatively sound. With approximately 97% of New Zealand firms having 250 employees or less (MED {MBIE}, 2011b), this research is expected to contribute to debate that it is New Zealand SME to which we look for economic growth. Care is taken to ensure that analysis drawn from this study is not extended improperly to the sector. As

many of the case study firms grow in line with investment in the industry (Figure 4.1), it is with profound significance that according to the CEO of Organisation S, “from an economic lens 25 years on, those (energy) assets now are earning multiple billions of dollars in export earnings facilitating billions of dollars of royalty payments to government.”

Authors, some recent and others not so recent, have recognised that understanding firm level abilities is an important pursuit (Helfat et al, 2007; Penrose, 2009 (1959); Teece, 2009). The research itself is limited by the quality of the interview process. Sufficient preparation mitigates this limitation (Bryman & Bell, 2005). A limitation of semi-structured (or qualitative) interviews being two way ‘conversations’ is required to maintain the quality of the data collection (Yin, 2010). Limiting the number of interviews conducted per day mitigates this concern. The research questions have been constructed to fill a gap in current research and contribute to a wider economic understanding. The researcher’s experience interacting with personnel within the industry complements interviewing skills (such as empathy, understanding of context). This adds substantial value to the interpretation of the accumulated data (Daft, 1983).

5.7 The research contribution.

This research is expected to contribute to filling the theoretical gap that exists between dynamic capabilities and firm growth as Figure 5.1 illustrates. However the mechanism with which to do so remains undeveloped. It is important to develop this mechanism, as Helfat et al (2007) suggest that dynamic capabilities’ association with firm growth broadens the disciplinary base and contributes to a conceptual framework. Empirically, this study contributes to the growth and development of New Zealand’s firms such that “entrepreneurs can be helped to develop informed assessments of opportunities and difficulties ahead.” (Garnsey, 2002, p. 123). Not only empirically, but theoretically, this study develops the mechanism by which the nature of dynamic capabilities’ influence firm growth can be illuminated. This mechanism charts a way for the relationship between dynamic capabilities and firm growth to be understood and move this research towards an “empirically relevant paradigm.” With this paradigm a firm may be able to mitigate negative external influences on growth and optimise internal growth opportunities (Penrose, 2009 (1959)). The answers to the research questions posed earlier might be used to develop internal tools for New Zealand businesses to grow. The choice of industry is deliberate as it is an important industry, capable of contributing significantly to New Zealand’s success as an exporter and development of local business capabilities. This type of research has not been undertaken before (Table 3.4) and is expected to be of interest to

policymakers and practitioners. Furthermore, the opportunity this research presents to the New Zealand energy industry as the CEO of Organisation S suggests,

“I just find that quite interesting, the stereotyping of both the Wellington centric and Auckland centric, to the extent that if you look at our growth agenda as a nation, nowhere is the petroleum and oil and gas industries listed anywhere in any government lexicon until very, very latterly, and even currently today NZTE do not see it as one of their growth sectors.”

The opportunity then is that this industry is taken seriously at all levels of the economy, including entrepreneurs, regulators, legislators and investors.

Case studies are considered to provide a comparative example of their dynamic capabilities and how they affect growth. The context is the New Zealand energy industry and engineering firms which operate in it.

Through the case study methodology, the answer to the question of how dynamic capabilities influence growth can be discovered. The dynamic capabilities framework presents a mechanism to examine the “productive opportunity” a firm in this industry can harness through its ability to sense and seize opportunities and transform the resources which offer it a competitive advantage. By directing the enquiry at the firm’s key dynamic capabilities management skills, key dynamic capabilities processes can be discovered and tested for evolutionary fitness. Preparing the dynamic capabilities evidence at the stage of firm growth is a pragmatic response to seek out the truth of whether dynamic capabilities influence firm growth. As “description, explanation and prediction are intertwined building blocks of theory”, (Gligor, Esmark, & Golgeci, 2016, p. 95) the next chapter describes and explains the case and subsequent data preparation.

Chapter 6: The research cases.

6.1 Introduction.

In total fourteen small New Zealand owned and located firms (less than 250 FTEs) and two large firms and three industry organisations were interviewed. One of the large firms, Firm P was not large until more recently, but is still privately owned and based in New Zealand. In accordance with the research methodology detailed in Chapter 5 of this thesis, semi structured interviews were conducted. In line with the discussion on selection of cases in Chapter 5, namely to provide “maximum variation” (Flyvbjerg, 2011), a point was reached where this variation between high and low growth performance was observed. It later became evident that a point of data saturation was reached (Eisenhardt, 1989; King & Horrocks, 2010) when firm’s stories were taking on a similar tone.

Data gathered in the interviews were verified by triangulation methods (Yin, 2010). Triangulation data included observations, firm data (where provided) and publically available information. Firm and industry data were provided, some was confidential and only able to be used to contextualise the cases. The design of the questions to guide the interview were deliberately structured to extract a firm’s story, their growth trajectory, industry understanding and then more specific questions centred on the key organisational skills, which lie at the “heart of dynamic capabilities” (Teece, 2009). The analysis of the cases centred on identifying processes for their contribution to “evolutionary fitness” (Helfat et al, 2007) at inflection points on the firm’s growth curve. Where processes were identified as being “evolutionary fit”, they were then categorised as a sensing, seizing or transforming dynamic capability.

There are a range of growth trajectories in the case sets. This data set proved to be beneficial from establishing the interpretive analytical approach as discussed by Yin (2010). The fourteen (plus one – Firm P) firm level growth trajectories demonstrated growth per se. These cases were then analysed to see if there was evidence of key dynamic capabilities. Importantly, the case analysis was directed at answering the research questions in relation to the firm’s growth trajectory. This case analysis includes the use of retrodution to understand the effect dynamic capabilities may have on the growth trajectory of the firm (Eisenhardt, 1989; Miles & Huberman, 1994; Sayer, 1992).

Furthermore, the disassembling stage of the analysis as suggested by Yin (2010) includes coding the interview transcripts, analysing the codes in conjunction with the growth trajectory, triangulating the data with further available information. The latter includes publications, observations and in some cases confidential information. Industry information was also gathered from interviews of industry related organisations, such as associations, and is included to provide not only a triangulation

purpose, but also to add to the industry discussion as in Chapter 4. Industry growth is considered in the retrodution process as growth of the firm is linked to the growth of an industry as Marris (2002) points out in his discussion on the demand “side” of a firm’s growth trajectory. This is also discussed in Chapter 4.

The reassembling stage of the data analysis involves putting the dissembled data together through a reductive process. The reassembly process considering all of the inputs is designed to provide an interpretation of the data. The collective interpretation of the data of the cases is expected to illustrate the effect dynamic capabilities have on firm growth. The sampling framework established prior to the data gathering is presented as per Table 5.1. In this framework, Firms B, K and F were seen as small firms experiencing high growth relative to other cases. Firms E, O and P were seen as larger SMEs experiencing high growth. Firms M, J and N were seen as small firms experiencing lower growth relative to the other firms. Lastly, the sampling framework considered Firms I, G and L, larger SMEs experiencing lower growth. Whilst these were not all the cases considered, as Firms A, D and H were also analysed, they represented the a priori classification of the sampling frame. Four of the case studies and data analyses are presented below as examples, one from each quadrant of the sampling framework as Table 6.1 illustrates.

Table 6.1 – Sampling framework cases presented in Chapter 6.

	Smaller SME	Larger SME
High growth	Firm B	Firm E
Low growth	Firm J	Firm L

The case summaries presented here were all prepared individually to ensure the researcher becomes, “intimately familiar with each case as a stand-alone entity” (Eisenhardt, 1989, p. 540). The process of preparing the cases thus ensure that “unique patterns emerge”, the number of cases allowing these patterns to be compared to each other (Eisenhardt, 1991), thereby contributing to the rigor of the research process.

Finally, the results of the cases (excluding large Firm C and Organisations Q, R and S) are presented in tabular format (all cases in Appendix D).

6.2 High growth smaller SME - Firm B case study.

The managing director of Firm B was in a career transition when he happened upon an opportunity with two acquaintances to start up a related business. The two acquaintances wanted to separate out a non-core aspect of their business (Firm H). The managing director took a minority shareholding in the firm. The managing director started out with 2 staff and slowly built the business to a level where it is recognised as a specialist engineering contractor to the utilities industry. Figure 6.1 illustrates this growth path. This firm is a start-up where features of the manager's skills, decision making, communication and rewards to the owner/s are synonymous with the creative stage of growth (Greiner, 1998 {1972}). The initial growth centred on establishing the business as a viable contractor option for the larger utilities companies can be attributed to the managing director's networks, both pre-existing and sensed. The managing director has been active in business and technical networks prior to the start of the firm. He attributes the establishment of the firm in the market thus, "engineering is quite conservative so you start to get to know people, managers get moved around a bit more, you've done a few jobs and been successful."

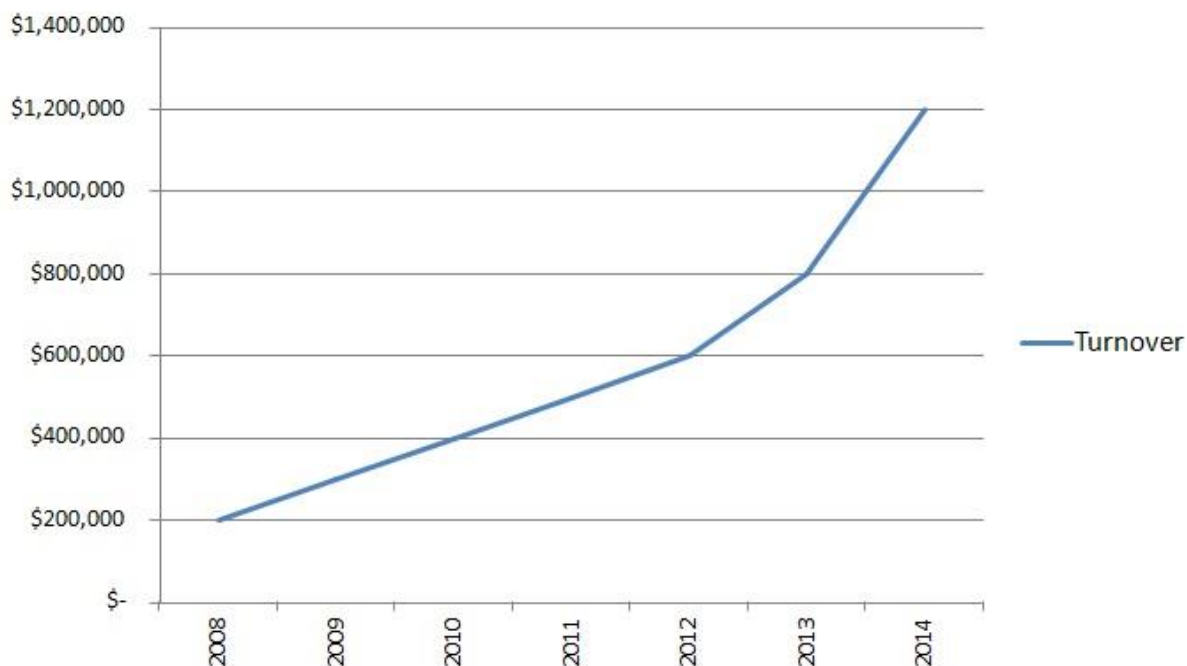
Following on from this start, when the business got to a stage where it was being recognised in the marketplace (in part attributed to firm image as well as project efficiency) complexity was experienced. These included multiple projects being managed at one time, in house skill sets not being sufficient for successful project completion. The response was to do several things. In 2012 the managing director began to introduce procedures in to the firm and hire sub-contractors. From this period growth began to accelerate. The next significant undertaking was to change the governance of the business. It occurred to him that the governance structure was a limitation to growth and commented,

"One thing I have learnt through myself is that I like the risk and I like the freedom and the only time I feel like I guess taking a break and just doing nothing and I guess just retiring or chilling out or getting a job is when I am burnt out and I need a rest. But as soon as I've had a rest I just want to go back in and take risks again. I just see an opportunity and I just want to follow it up and see how far it will go."

Having non active majority shareholding business partners was holding the managing director of Firm B back from realising his freedom to express himself through his business. The other business partners were bought out in early 2014. It is too early to say that this immediately resulted in business growth. Suffice to say in early 2016, the business is thriving and an operations manager has been recruited to allow the managing director to focus on growing the business, thus creating the "productive opportunity," (Penrose, 2009 (1959)).

The hiring of a manager signals the recognition of a potential crisis of leadership and the business moving to the directional phase of evolutionary growth (Greiner, 1998 {1972}). With the business now more profitable, “the profitability has been better this last year,” the business is better equipped to grow sustainably (Davidsson et al, 2009; Schumpeter, 1947).

Figure 6.1 – Growth trajectory of Firm B.



Small to medium businesses, especially start-ups as new as Firm B do not leave much legacy to explore the effect of processes associated with growth if growth is measured on profitability alone. It is reasonable to expect that turnover is important to create a viable business and in the case of Firm B, this was initially the case, the managing director commented,

“turnover is important, particularly if you are looking at resale I’ve noticed. Before I wasn’t fussed about turnover so much, I was looking at cash flow, especially when we are young, whereas now I’m happier to take a job and make five or ten per cent on it because that contributes to our turnover and it makes our business look healthier.”

This points to the strategic intention behind decisions contributing to growth as larger, less profitable projects are pursued with the express purpose of growing turnover. The externality of this strategy is to introduce complexity into the business, for which the managing director appears to be well equipped to contend with. Some of this could be attributed to his experience and learning developed in previous roles and entrepreneurial learning (Deakins & Wyper, 2010; Politis, 2005).

Where the path of growth of Firm B is attributed to the presence of dynamic capabilities will depend on the strategic intention of the firm and in the case of the start-up, the managing director. Evidence

of this strategic intent is twofold. One is the ambition of the managing director and the development or articulation of this in a plan. In this case, there is evidence of an active desire not to have a plan; *“Business plans, I used to believe in them emphatically but to me it just seems like an exercise for an accountant now,”* and an obsession to achieve a lifestyle, *“personally it’s having that free time as well because it’s a lifestyle choice.”*

On the face of it, this case exhibits little evidence of explicit dynamic capabilities, yet several processes associated with some dynamic capabilities are evident, especially since 2012. These are outlined below in Table 6.2.

Table 6.2 – Summary of Dynamic Capabilities process effects on growth for Firm B.

Code (addressing RQ)	Year Implemented	Data Source	Key Skill	Management	Process	Evolutionary Fitness (Helfat et al, 2007)	Scale	Growth Mechanism (Penrose, 1959), (Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	2008	Interview, literature, observation.	Learning knowledge management.	and	Identification of target market segments, changing customer needs and innovation.	This set up the firm and to an extent the flexible firm culture.		Market bases, multiple resource technological bases, linkage,	Steady firm growth for 4 years.
RQ1SENSMKTR&D RQ2SEIZBUSMODEL RQ2SEIZBOUNDARIES	2012	Interview, publically available information, observation.	Learning knowledge management, Business design, Investment allocation, orchestration.	and Asset	Selecting target customers, designing revenue architecture and mechanisms to capture value.	Understanding the limitations of the business , outsourcing became evident and is now part of the firm's modus operandi.		Multiple sources of linkages, market bases, related linked expansion.	Increased business growth.
RQ2SEIZDECISION	2012	Interview and observation.	Learning knowledge management, Governance, Investment allocation, orchestration.	and Asset	Selecting decision making protocols.	Procedures and systems introduced.		Multiple resource linkages, response to external threats.	Increased business growth.
RQ2SEIZDECISION RQ3TRANSGOV	2014	Interview and publically available information.	Learning knowledge management, Governance, Business design, Investment allocation, orchestration.	and Asset	Governance change.	The limits to growth were identified and the inactive business partners bought out. Decisions much easier to effect.		Internal influences, response to external threats.	Increased business growth.

6.3 Low growth smaller SME - Firm J case study.

Firm J started out in the mid 1970's as a start up with some key agencies associated with the New Zealand oil and gas sectors. The firm had a varied ownership history being owned by entrepreneurs and a multinational. In 2008 an entrepreneur with experience and other businesses in the industry added Firm J to his portfolio when he bought out another entrepreneur. He was not directly involved in the business. Figure 6.2 illustrated the revenue and profitability trajectory since 1997. On the face of it the firm would not necessarily be one worth investing in. Nonetheless, the most recent owner saw some value in Firm J.

The general manager joined the firm as a sales engineer several months prior to replacing the chief executive officer mid 2008 at the behest of the owner on advice from the firm's accountant. With the business generating value through its relational value chain (Gereffi et al, 2005), the required focus was on developing business networks to in pursuit of profitable business (Davidsson & Honig, 2003). Yet the general manager struggled to get relationships embedded within the organisation and outside due to poor interpersonal relationships. For instance, during the time of the firm purchase, according to the general manager the owner,

“changed solicitors three times and accountants twice. That doesn't build for a long term relationship with anybody, all because he'd have a personality disagreement with someone.”

Despite the picking up of a major agency in 2007/2008 combined with a demand for the goods due to industry growth (Figure 6.3), and the subsequent growth in revenue, the firm still failed to make much profit. Staff relationships were poor too and internally there were issues which affected the business operationally. For instance, the previous CEO was kept in the business after he was demoted, yet retained on his original salary due to his industry experience (he had been with the firm for 38 years). Productivity declined, as for instance as internal communication suffered,

“all of a sudden an order would get placed on [Redacted] (purchasing manager's) desk and no one would know anything about it. Then you'd have to go through the costing to make sure they put the right amount of margin on it. It was pretty difficult”(general manager Firm J).

The firm adjusted by employing more staff. Poor management of suppliers did not help the firm develop a value proposition within the relational business model. For example several key agencies were lost when the agencies went with an employee who exited the business and set up on his own. The effect of this in 2009 is evident in Figure 6.2. Red arrows indicate a period of growth in Firm J's industry index (Figure 6.3). Matters became worse as overheads increased and margins reduced. In 2012 matters were dire with the firm having lost approximately \$350,000 in 3 years. Improvement came when a consultant came into the business with the authority to make changes. Drastic action

was taken with 50% of the staff made redundant, direct marketing processes introduced, procedures implemented, for instance in response to the instances where orders were received without any records, the general manager installed a system that “made sure that that quote number went out to the customer so that if that number came back at least you knew where to find the file.” A process to reinvigorate the relational business model was instituted with customers targeted with direct visits and suppliers, now greatly diminished in number, signed up with contracts.

Figure 6.2 – Growth trajectory of Firm J.

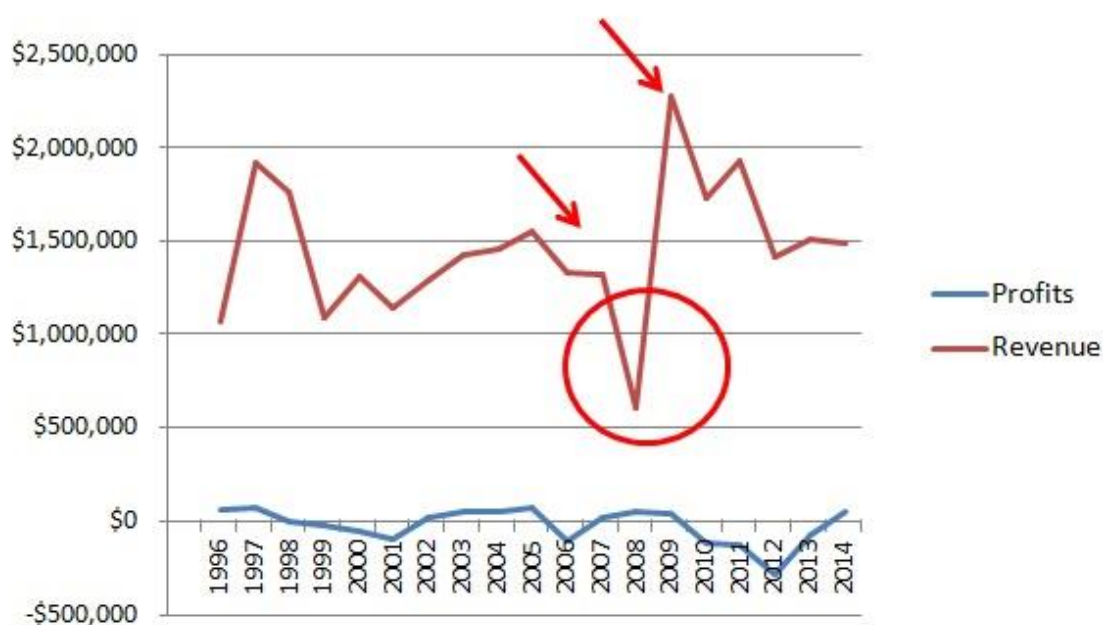
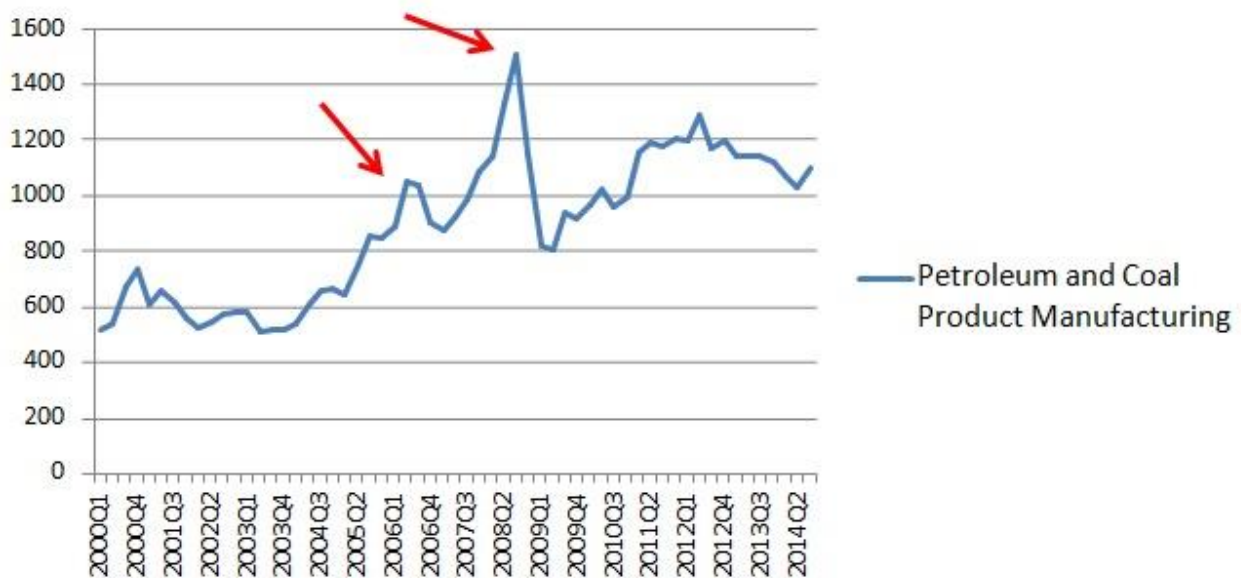


Figure 6.3 – Petroleum and Coal Product Manufacturing Index 2000-2014. (www.stats.govt.nz/infoshare)



The above case study is one that illustrates the haphazard manner in which this business was run compounded with poor internal communications and external relationship building were not developed and enhanced. This effectively illustrates a poor awareness of the appropriate business model. If one requirement of dynamic capabilities is to “spot the opportunity to earn economic profits, make decisions and institute the disciplines to execute on that opportunity and then stay agile so as to continuously refresh the foundations of its early success, thereby generating economic surpluses over time”, (Teece, 2009, p. 60), then Firm J is an example where dynamic capabilities are hard to find. The firm has demonstrated very little strategic intent, evolutionary fitness, sensing, seizing and transforming capabilities at all. After going through the interviews, observations and other information (for example the very bland website, has many products listed but many pictures are missing), it is very difficult to find evidence of processes that can be associated with dynamic capabilities.

It is possible to argue that a dynamic capability process associated with sensing external technological developments existed that helped the firm seize on the major agency which allowed it to capture growth in the industry as illustrated by the red arrows in Figures 6.2 and 6.3. It is evident that even having lost agencies, within the business the capability to sense external technological opportunities remained, yet was not seized. The general manager commented,

“the first thing that I did was to track down [Redacted] to try and replace [Redacted] and they had all the right equipment along with [Redacted] and [Redacted]. I got them on board, got exclusive agreements with them.”

Despite these supplier agreements the firm was unable to seize these opportunities, the general manager explains, “we had the opportunities with ‘supplier B’ but as you know that fell away.” Table 6.3 below summarises the dynamic capabilities which are associated with growth in the firm. Whilst there were periods of growth, in particular 2007/2008 – 2010, with the low and negative profits it is likely this growth was not sustainable (Davidsson et al, 2009). Without sustainable growth, then the firm with its current resources and processes are unlikely to generate “economic surpluses over time.”

Table 6.3 – Summary of Dynamic Capabilities process effects on growth for Firm J.

Code (addressing RQ)	Year Implemented	Key Skill	Management	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSEXTR&D RQ2SEIZBUSMODEL	2007	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	and	Acquires external innovation ahead of competition. Selecting the technology and product architecture.	This process due to active searching and network abilities allowed the firm to realise a market opportunity.	Market bases, multiple resource linkage, multiple sources of linkages, collaborative activity.	Revenue increased dramatically.

6.4 High growth larger SME - Firm E case study.

Firm E is a specialised contractor in the Australasian energy market. The firm started out when the managing director with some contracting experience courtesy of the New Zealand family business started work in Western Australia. The benefits of the social and family networks in the managing director's success presents the firm from the outset a better chance at success (Davidsson & Honig, 2003). There was plenty of demand for that type of work in the early 1990's. In the mid 1990's Firm E sought and got accreditation for a specialised product application. This opened up opportunities to work with multinational material suppliers on major projects. This had the added effect of increasing the barriers to entry for competitors (Porter, 1980).

The firm then moved to Queensland once a large contract was secured there in 1998. The managing director continues to work in New Zealand for the energy industry on a project by project basis and has a material supply business based in Auckland. Up until that point with the managing director directly involved in work, the firm was very profitable. This continued during the phase of steady growth until 2009. At the time the business moved to Queensland, the managing director offered shares to key personnel because he was,

"grateful for their loyalty and we were all friends, we were all mates. And I knew that I needed their skills, I needed them to be involved."

This changed the dynamics in the business and saw a period of sustained growth. This sustained growth was attributed to nothing other than,

"doing a good job and getting a reputation, there wasn't any sort of marketing or anything like, that, just trying to do a good job and marching from one project to the next."

This illustrates the ability of a firm to display technical fitness (Helfat et al, 2007) where the firm was more effective than others to secure and conduct work in an efficient manner. This did not mean that the firm showed evidence of dynamic capabilities as there is no evidence of a business plan until more recently. When the Global Financial Crisis affected the wider regional industry as Figure 6.5 below suggests, Firm E, Figure 6.4, was similarly affected.

The change in the industry was not sensed and by the time it was, the firm failed to seize on the opportunity to restructure. The managing director commented, "I had my head in the sand and hoped that it wasn't going to be as serious as it was and I kept a lot of people employed that I should have laid off." This illustrates a poor market sensing capability.

Illustrating how the firm survived this period the managing director commented,

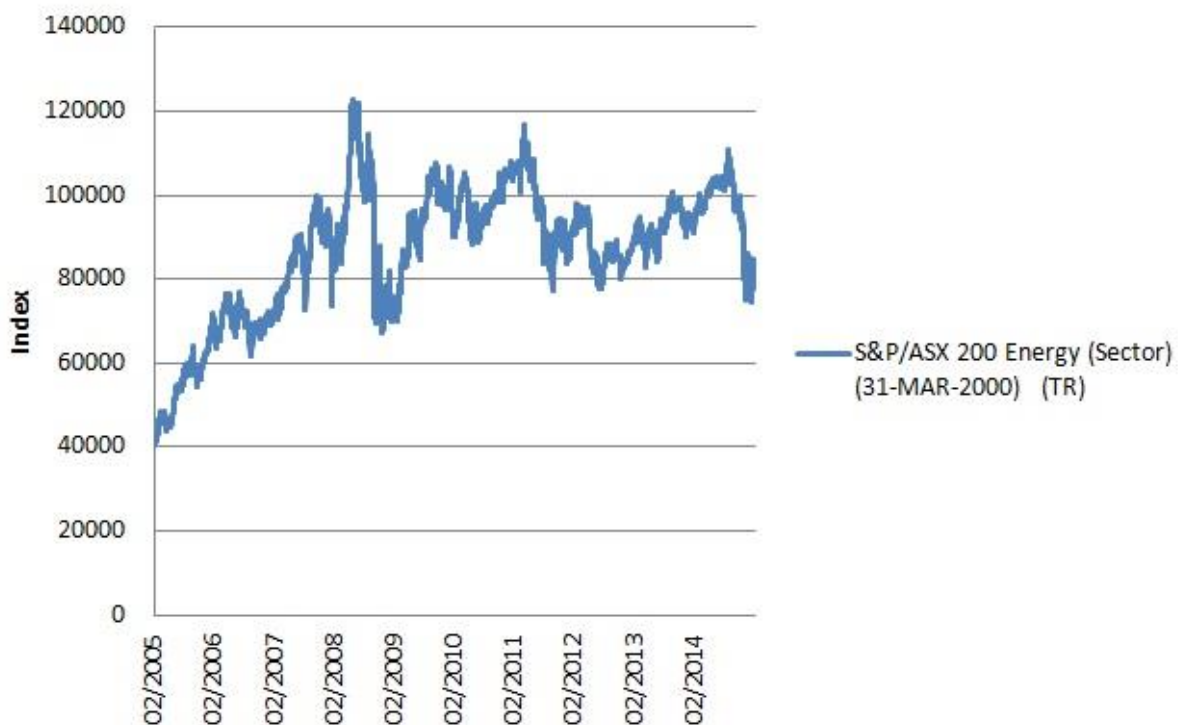
“I was nearly going completely broke. In fact I had to do a fair bit of jiggery pokery too, I was basically trading in insolvency, but I managed to pull rabbits out of hats. Once we got going again with these LNG (liquid natural gas) projects we just had exponential growth again.”

This shock and subsequent drop in revenue inspired the managing director to review and restructure not only the business, but the business model. “I’ve always had complete autonomy and I still have really but I guess I am a lot more consultative these days than I was in say 2000. In 2000 I just reacted and did what I thought” suggests a high entrepreneurial learning capability (Politis, 2005). This more open and consultative approach led to the managing director acquiring a mentor. The process implemented at this stage (2010) was to use the mentor as, “a sounding board, he’s an older guy and very experienced.” Whilst the managing director describes this change in 2010 it was not until 3 years later that he brought another director on board with corporate experience and invested in a sales force. Related market growth demands took the managing director offshore to seek and acquire work in Singapore and Indonesia.

Figure 6.4 – Firm E growth trajectory.



Figure 6.5 – Australian Stock Exchange – Energy Sector Companies Index 2005-2015.
www.asx.com.au/products/sector-indices



Interestingly the managing director of Firm E describes his measure of growth as people, an enjoyable aspect to business. He is aware that his role changes as he surrounds himself with competent people. He commented, “it means that I am becoming more of a chairman I guess.”

A business plan was only developed in 2011 instigated by the requirement to deal with a large multinational. The managing director recognised though that it was important in order to be able to clear up communication with key business partners. The spin off was that he gained internal benefit from the exercise because the process,

“crystallises where you want to go and what you need to invest in, in terms of equipment and in terms of people training. Once you put all those things on paper then they come to the front of your mind. So yeah it’s definitely a very positive exercise.”

Whilst this response to an external factor provided some benefit it is hard to see it as a strategically initiated process. The process behind it lies in the seizing of co-specialisation boundaries.

With this plan in place, the firm has shown dramatic growth in revenue as Figure 6.4 illustrates. This gave the firm the impetus to change various things in the business. The firm was able to invest in technology, hired a corporate accountant, invested in geographic expansion, product diversification and multiple skills. It is possible to see that the firm gained advantage from a rise in the industry’s fortunes as Figure 6.5 suggests. The question remains, is this kind of growth sustainable and is it driven by strategic intent? The managing director commented about the latest stage of growth, “It’s

different now because it's deliberate growth." This suggests that perhaps the sensing capabilities of the firm may not be evident at an earlier stage of growth (2000-2007), but the firm was in a position to seize the opportunities when they presented themselves. Yet analysing the firm's processes as to whether they create, extend or modify resources, during the latest stage of accelerated growth, there is evidence of sensing, seizing and transforming capabilities. These evident dynamic capabilities and their associated processes are summarised below in Table 6.4.

Table 6.4 – Summary of Dynamic Capabilities process effects on growth for Firm E.

Code (addressing RQ)	Year Implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSEXTR&D RQ2SEIZBOUNDARIES RQ3TRANSSKNOWL	1997	Interview	Learning and knowledge management, Business design, Asset orchestration.	Processes to acquire supplier and complementor innovation. Assessing appropriability. Recognition and capturing co-specialisation economies.	The firm actively sought out a specialised accreditation which enabled it to protect its position in the market and work closer with collaborators. Used complementary products provide by others.	Multiple resource linkages; multiple sources of linkages, collaborative activity, technological bases facilitating diversification.	Steady profitable growth for 12 years.
RQ2 SEIZLOYAL RQ3TRANSGOV	2000	Interview, publically available information.	Governance, Business design, Investment allocation, Asset orchestration.	Building loyalty and commitment. Incentive alignment.	The MD realised that he had to secure the skills and reward loyalty of his key staff and offered them shareholding in the business.	Multiple resource linkage.	Steady profitable growth for 9 years.
RQ2SEIZBOUNDARIES RQ3TRANSCOSPEC	2000	Interviews & publications.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Undertook collaborative and alliance activities.	Signed formal alliances with key industry firms including multinationals.	Multiple sources of linkages, collaborative activity.	Steady growth for the next 9 years.

RQ2SEIZDECISION	2010	Interview, observation.	Learning and knowledge management, Governance, Investment allocation, Asset orchestration.	Avoiding decision making errors.	The MD acquired a mentor and then used him to plan strategically.	Response to external threat, multiple sources of linkages and collaborative activity.	Accelerated growth.
RQ1SENSMKTR&D	2012	Interviews.	Learning and knowledge management.	Processes to identify target market segments, customer needs and innovation.	As part of the strategic plan, the firm began to hire regional and industry salespeople with experience.	Multinational enterprise, technological bases, market bases, related links, response to external threat.	Greater geographic reach.
RQ3TRANSGOV	2013	Interview	Governance, Business design, Investment allocation.	Recognising inflexion points and complementaries; a turning point occurs which changes the way of thinking and acting.	The MD restructured the business to corporatise it by bringing in a resource to do so. This changed the business in relation to governance, agency, loyalty, alignment of resources and knowledge management.	Multiple resource linkages, response to external threats, multiple sources of linkages.	Moderate growth.

6.5 Low growth larger SME - Firm L case study.

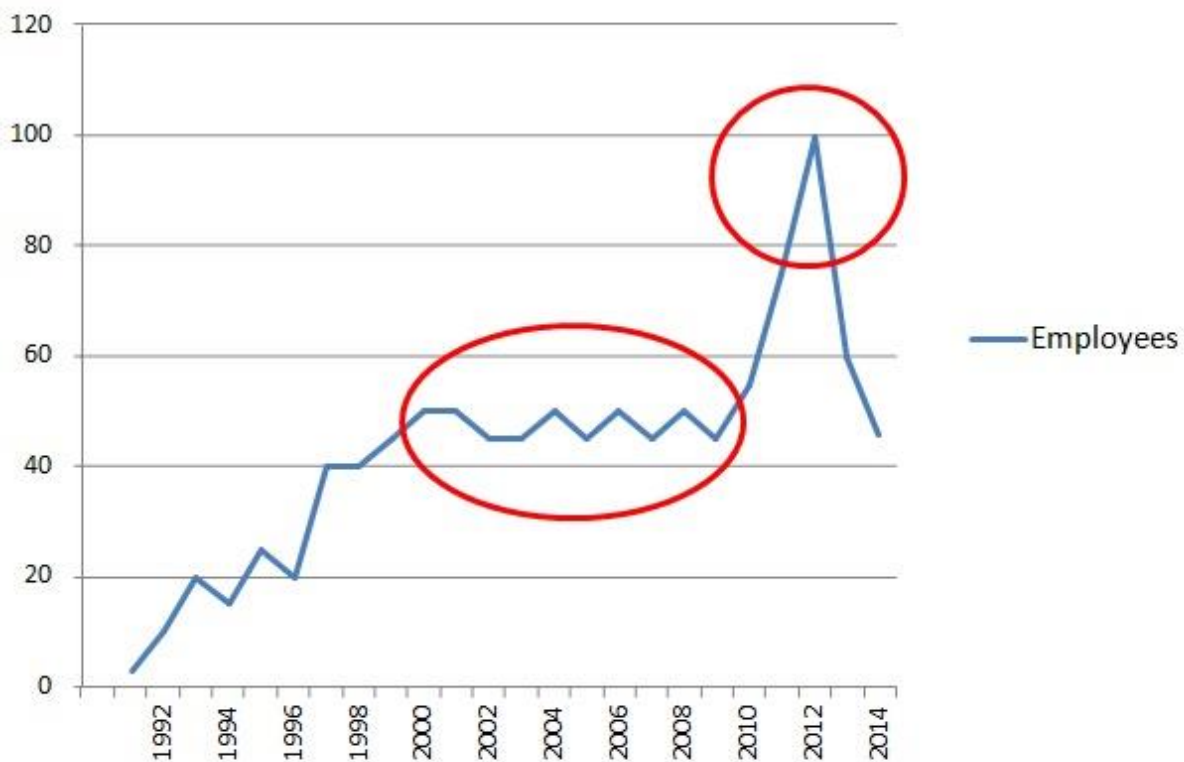
Firm L was started in 1991 when an engineer returned from working in the oil industry, mostly in the North Sea. The motivation to start up an engineering fabrication business was linked to the entrepreneur's experience and identified opportunity reasoning by Firm L's managing director that the large oil firms "never go broke." This scenario is consistent with the transformational concept of entrepreneurial learning (Politis, 2005). After 2 decades in the energy industry and having seen recent growth in the business occur (at one point employing over 100 FTEs) there has been a decline in FTEs as illustrated in Figure 6.6 below.

The business grew initially on the back of some good relationships with the oil firms. The networking resource is evident in the initial phase of growth. This provided the firm with the requisite sensing capabilities to enhance its core capabilities (Davidsson & Honig, 2003). The managing director commented,

"Back then it was all about relationships within the engineering fraternity and the oil industry. We spent a lot of time in Wellington going and talking to these people and bringing our guys up to a very, very high standard in welding."

The period 2002-2009 was characterised by geographic growth, mostly in Australia. The reason for the firm looking outside New Zealand was financial, according to the managing director, the "oil industry per se is too small in New Zealand for a firm to survive solely on their opportunities." Firm L made a foray into the dairy industry in New Zealand in this period, but were not considered according to the managing director, "the dairy industry is an old boy's network". Today however Firm L is doing work in the dairy industry. This is attributed to the increased rate of growth in this industry.

Figure 6.6 – Growth trajectory of Firm L



The growth into Australia in the period after 2002 did not appear strategic, but rather Firm L was invited to do some projects in Australia due to a network established on a separate job in New Zealand. The subsequent work with major oil and utilities companies was characterised by limitations to growth; unions, lack of consultants providing a neutral bearing on projects and legal battles with major companies. Despite these initial limitations to growth, Firm L found its niche in Queensland where the firm established an office. From this base, the firm was able to establish itself in the Australian market.

The next period saw accelerated growth as Figure 6.6 illustrates. This growth was attributed to the diversified service offering, greater geographic reach and work available in New Zealand. At one stage, Firm L had 40 staff located in Australia. From 2012, projects started to be completed and no further growth possibilities were evident. The Australian team then downsized to 6. It was during this time 2012-2013 that the managing director actively sought out different ways of doing things. Processes corresponding to dynamic capabilities were becoming evident.

Without a business plan or evidence of strategic intent, Firm L relies on external influences to direct firm strategy. As strategic intent is a requisite of dynamic capabilities, to illustrate the lack of (at least) sensing capabilities evident, the managing director commented,

“now our name is out there and these companies are starting to call, but there’s still a hang of a lot of other ones out there that have no idea about us, who we are.”

Locally, opportunities driven by external factors, such as the Christchurch earthquake, have conspired to offer work opportunities. The core competency of the business according to the managing director is Firm L's "ability to understand what the oil industry needs, how they want it and our willingness to provide that to them."

In seeking the firm's dynamic capabilities through analysing processes from interviews, observations and market information, it is possible to see some evidence at the early stage of the firm's existence and more recently. For instance, the original creative stage of the firm's growth (Greiner, 1998 {1972}) relied on the experience of the managing director and his networks. It could be argued that the strategic intent or "obsession" (Augier & Teece, 2009) of the managing director is acceptable as a precursor to dynamic capabilities and evidence of a dynamic capability process can be classed as such. Hence, early on, there were sensing and seizing capabilities, where the market offered an opportunity for growth. Beyond this (RQ1SENSMKTR&D, RQ2SEIZBUSMODEL) there is little evidence of other dynamic capabilities until most recently where joint ventures, further changes in the business model and governance occurred.

Whilst Firm L does not exhibit recent growth (in fact a decline is evident), according to a mentor the business is sound and has resilience beyond the vagaries of the economic environment. The managing director commented that the mentor,

"has taken him from a very average business to a very successful business. So I am looking forward to having him on board. He's looking forward to being there, understanding the business for the next three or four years, and then watching what these little ratbags of sons of mine are going to do with they come on board. So he's coming on board as a director and that way I know there'll be some stability when the other boys take over."

Table 6.5 below summarises Firm L's dynamic capabilities processes, most of which have been implemented recently. The managing director commented, "he (the mentor) doesn't seem to think there is anything to worry about." What is evident is that the recent intentional changes have presented the firm with an internal growth opportunity, realised recently with the acquisition of plant and skills to take advantage of a vertical business opportunity.

Table 6.5 – Summary of Dynamic Capabilities process effects on growth for Firm L.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	1992	Interview	Learning and knowledge management.	Identification of target market segments, changing customer needs and innovation.	This arguably set up the firm and to an extent the flexible firm culture.	Market bases, multiple resource linkage, technological bases.	Steady firm growth for 8 years.
RQ1SENSMKTR&D RQ2SEIZBUSMODEL	2002	Interview, publically available information, observation	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Selecting target customers, designing revenue architecture and mechanisms to capture value.	Opportunity allowed the firm to expand into another geographic area, the firm then established a permanent operation to capture this opportunity.	Multiple sources of linkages, market bases, related expansion, multinational enterprise.	Accelerated geographic and business growth.
RQ1SESNEXT&D RQ2SEIZBUSMODEL	2012	Interview and observation	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Acquires external innovation ahead of competition. Recognizing inflexion points and complementarities.	The firm started up a complementary business to take advantage of complementary services.	Response to external threats, related linked expansion, technological base, vertical integration.	Growth in product and service offering.
RQ2SEIZDECISION RQ2SEIZBOUNDARIES	2012	Interview	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Selecting decision making protocols. Selecting enterprise boundaries to manage complements and control platforms.	Collaborative activity with a major engineering consultancy to provide neutral intermediary between Firm L and the big oil companies. Staff embedded mutually between companies.	Internal influences and collaborative activity, response to external threats.	Moderate increase in profits.

RQ2SEIZDECISION	2013	Interview and observation .	Learning and knowledge management, Governance, Investment allocation, Asset orchestration.	Selecting decision making protocols.	Brought in external board member to review the business processes and provide independent advice.	Response to external threat, divestment.	Focus on core activities.
RQ3TRANSGOV	2013	Interview, publically available data.	Governance, Business design, Investment allocation, Asset orchestration.	Governance structure changed.	A board was assembled with a mentor included.	Response to external threat.	Moderate increase in profits.

6.6 Case study dynamic capabilities results.

This chapter introduced four of the case studies, written up from interviews, observations, publically available and privately supplied information. The case studies were analysed from this information, with key points distilled into the case summaries as 6.2, 6.3, 6.4 and 6.5 describe. The summaries conclude with the dynamic capabilities summary tables, the full complement of summary tables are attached in Appendix D. The balance of the firms analysed are categorised in the sampling framework in Table 6.6. The categorisation is done at face value based upon the firm growth trajectories.

Table 6.6 – Re-categorisation of sampling framework.

	Smaller SME	Larger SME
High growth	Firm B, D, F, H, K, N	Firm E, A, O, P
Low growth	Firm J, M	Firm L, G, I

However, the categorisation is rich with nuance as some firms such as Firm G, grew rapidly for a period and thence rapidly declined in growth. Placing it in the larger SME, low growth quadrant is a decision made on current performance. Yet, it could be argued that Firm O exhibits the same trajectory. As the research is endeavouring to answer the question of whether dynamic capabilities contribute to sustained growth, an understanding of what categorises sustainable growth, is required. Firm G and O grew at similar rates over time, yet latterly they decreased in FTEs. Firm G did not maintain its profitability; in fact its financial position deteriorated whilst decreasing in size to the point where now it has liquidated. When asked about the profitability of the firm at the time of the interview, the general manager replied, “we had the big blowout a couple of years ago it didn’t really grow.” Whereas Firm O’s profitability appears to have been stagnated, it continues to trade under strained circumstances, although up until recently the managing director commented that, “the dividend yield’s been quite good.”

Similarly Firm K, also declining in growth, is placed in a high growth category and has improved in profitability. A firm that maintains its profitability despite a decrease in size or geographic reach, product or service offering will be in a better position to realise growth when market conditions are favourable. Some of the firms that appear to have intentionally diminished in size or revenue, indicating a negative growth (such as Firms A, I and K), but have improved their profitability have in fact improved their “productive opportunity” (Penrose, 2009 (1959)). In so doing, the firm has created the opportunity to sustain subsequent growth only once a profitable situation is maintained

(Davidsson et al, 2009). Therefore, classifying firms into quadrants such as Table 6.6 is challenging. A further development on the “higher growth”, “lower growth” categories would be sustainable and unsustainable growth categories, based upon profitability of the firm despite its perceived decline in size (or other performance measure). Despite accounting profits being an uncertain measure in sustained performance (Helfat et al, 2007), in the constant context of the New Zealand energy industry, growth is a “useful performance measure” (p. 17). Growth over time is able to be measured as the firm growth trajectories suggest, but the nuanced aspect of sustained growth over time, is profitability over time. The multiple case studies require in depth comment on these nuances.

Chapter 7: Dynamic capabilities and firm growth.

7.1 Introduction.



























The research sampling frame categorised firms in terms of size and growth for ease of comparison. Upon analysis of the case studies it became apparent the cases are nuanced. This stems from the holistic approach taken to understand the internal mechanisms of firm growth from the owner's aspiration, performance measurement and success point of view. These are complex and multi-dimensional data sets, for example Firm M's owner initially stated he had no desire to grow, yet expresses regret later on that he "should have improved things or built it up or something like that". Having a complete set of measurement criteria enables the complexity of the data to be analysed to answer the research questions (Bandara et al, 2005). The measurement criteria in this case were established a priori as the key management skills or the "critical influencing factors" (Rugman & Verbeke, 1993). Table 5.7 presents the case study data as a "visual aid" allowing for ease of interpretation (Eisenhardt & Graebner, 2007).

Some of the fifteen research cases exhibited slower growth (or no growth) and others higher growth. In certain cases, growth went into a decline whilst other cases continued to grow over periods of time. Firms that grew over a period of time in an environment of rapid change exhibited sustainable growth (Teece, 2009). All the case study firms exhibited some form of growth in the period of their existence. The purpose of the semi-structured interviews includes finding out whether the firms are still on a sustainable path. All the firms were visited whether for observation or interview purposes. This adds to the rich story a firm's growth path has the potential to tell (Eisenhardt & Graebner, 2007). The interviews and triangulation methods add to the interviewer's depth of the "real life" understanding of the growth of the subject firm (Cassell, 2009). It is through this insight that the categories are formulated, in particular when categorising firms exhibiting unsustainable and sustainable growth.

Furthermore, the insight gained was not necessarily at the point of interview and subsequent data collection, but in the process of building the cases (Eisenhardt, 1989). The categories for analysis: unsustainable and sustainable growth, separate the firms that exhibit no or haphazard growth from those that exhibit continuous growth. It is worth noting that growth is typically non-linear (Garney et al, 2006). Common case study growth outcomes include size of firm (FTEs), geographic reach and revenue growth. The nuance as Chapter 6 suggested is the role profitability plays in a firm's growth trajectory. When divestment of assets (including personnel) as a growth mechanism (Kay, 2002; Penrose, 2009 (1959); Teece, 2007) results in a more profitable situation for the firm, the firm is then

better positioned (Davidsson et al, 2009) to intentionally take advantage of the internal “productive opportunity” (Penrose, 2009 (1959)) to pursue growth opportunities. Therefore, where growth trajectories decline but profitability improved, the firm was deemed as sustaining its growth through the creation of this “productive opportunity.” Firms such as A and I would be such examples. Table 7.1 summarises these results.

Table 7.1 – Case study firms trajectory and profitability summary.

Firm	Growth Trajectory	Growth Category	Profitability
A		Sustainable	
B		Sustainable	
D		Sustainable	
E		Sustainable	
F		Sustainable	
G		Unsustainable	
H		Sustainable	
I		Sustainable	
J		Unsustainable	
K		Sustainable	
L		Sustainable	
M		Unsustainable	
N		Unsustainable	
O		Unsustainable	
P		Sustainable	

Maintaining an unbiased approach to qualitative case analysis is a difficult but necessary practice. Yin (2010) suggests that by making “constant comparisons, being especially alert to negative instances, developing rival explanations and continually posing questions about your data,” (p. 177). This maintains the discipline that supports the integrity of the analysis. Table 7.2 then summarises the results of the application of this reasoning into the sampling framework, after case comparisons, different from the a priori framework, demonstrating the effect of delineating the data interpretation sequence (Yin, 2010).

Table 7.2 – Sustainable vs unsustainable growth case study firms.

	Smaller SME	Larger SME
Sustainable growth	Firm B, D, F, H, K	Firm A, E, I, L, P
Unsustainable growth	Firm J, M, N	Firm G, O (possibly)

In summary, the research questions relate to how the particular dynamic capabilities skill type influences firm growth. The research questions (RQ) 1 to 4 ask how the following influence firm growth: opportunity sensing capabilities (1); opportunity seizing capabilities (2); resource transforming (3) and renewal of dynamic capabilities (4). The latter is addressed in 7.3, once all the cases have been considered. Results of the data collection are summarised in Appendix D as per Table 5.3.

Sustainable and unsustainable growth categorisation allows the analysis to focus on evidence of dynamic capabilities processes these firms implemented at a particular time in their growth (or not) whilst providing a useful comparative paradigm (Eisenhardt, 1989). This categorisation is no more than bundling cases based on their growth curves whilst keeping the data emanating from them “objective” (Eisenhardt & Graebner, 2007). Then in order to focus on the research questions 1 to 4, the dynamic capabilities evident at certain (inflection) points of a firm’s growth curve are summarised in the “visual tool”, Table 5.7.

7.2 Firms exhibiting unsustainable growth.

As per Table 7.2, Firms’ G, J, M, N, and O are discussed with reference to the dynamic capabilities evident at certain stages in their growth trajectories.

7.2.1 Firm G – Dynamic capabilities and growth.

Firm G grew (Figure 7.1) on the back of favourable market conditions as Figure 4.1 presented. Firm G grew and invested where the managing director saw an opportunity, mostly in specialised equipment. The business did show some evidence of dynamic capabilities at a period which preceded accelerated growth. In 2006, skills were sought and acquired which allowed the business to implement systems associated with a larger business. Therefore, Firm G was able to sense the opportunity and seize it. This skillset complemented the business for its period of rapid growth until the market changed (from 2010).

This external influence was neither foreseen nor acknowledged by the business and the firm continued as if there was no effect on the business. As the general manager commented, *“we had less supervision, the productivity was not as good as what it could have been, staffing issues, it just got out of hand and of course the managing director just thought there was too much overheads already. He basically is head up his arse and not seeing the bigger picture.”*

This lack of sensing capability illustrates how without the ability of the firm to learn from its marketplace, there is no ability of the firm to seize opportunities, in this case, the opportunity to diversify or downsize prior to the business going through a crisis. The two periods of growth were analysed for evidence of dynamic capabilities which are summarised in Tables 7.3 and 7.4. The business remained in crisis, was not profitable and the general manager has left. In mid-2015 it went into administration. This business could rightly be categorised as one that exhibited unsustainable growth. Significantly, there is no evidence of transformational capabilities throughout the firm’s sometimes “stellar” growth curve. Neither is there evidence of profits in the downturn.

Figure 7.1 – Firm G – Growth trajectory and inflection points.

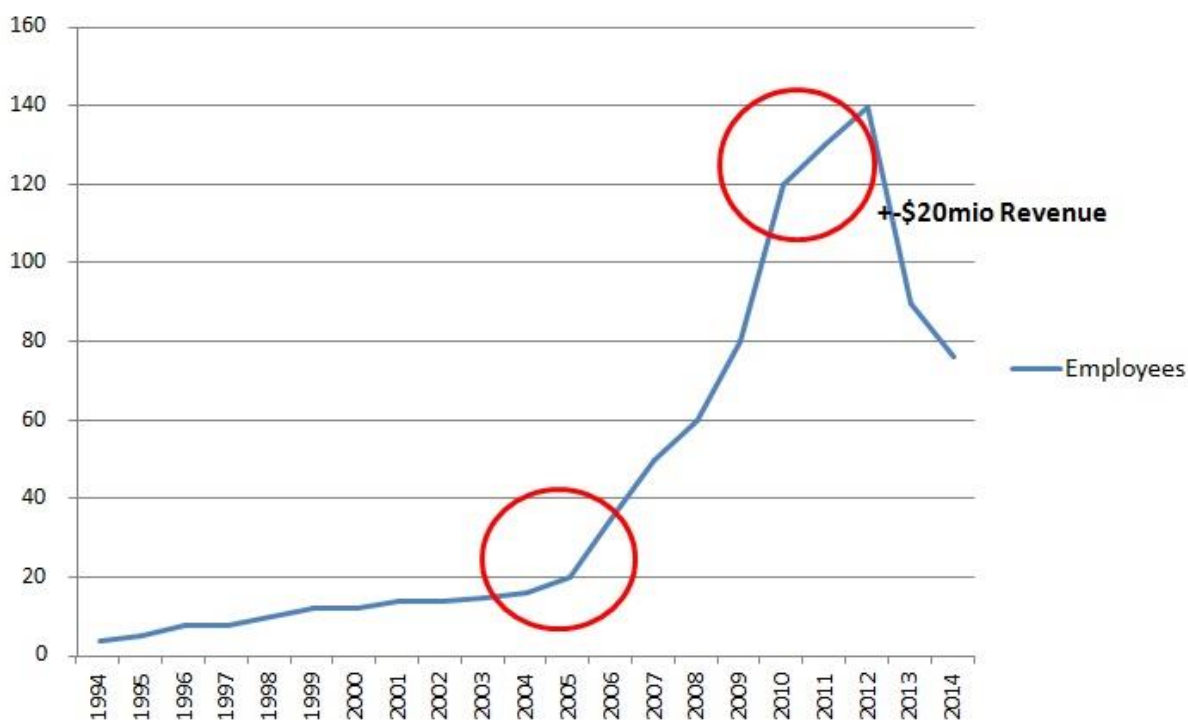


Table 7.3 - Firm G dynamic capabilities at the 2006 inflection point.

	2006		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Accelerated growth		

Table 7.4 - Firm G dynamic capabilities at the 2009 inflection point.

	2009		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills			
Business design skills		X	
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Diversified growth		

7.2.2 Firm J – Dynamic capabilities and growth.

Firm J’s story illustrates one of no net growth, both in revenue and profitability. As detailed in Chapter 6.3 earlier, from 2007 revenue dropped dramatically (Figure 6.2). The firm was largely supplying firms in the oil and gas manufacturing sector in New Zealand and were dependent on the industry growth to grow. Figure 6.3 illustrates the New Zealand coal and petroleum manufacturing index. A sharp drop was experienced from 2006-2007. Ironically at the same time there was a small increase in profitability. The general manager at the time was known in the industry for some very creative pricing, as the next general manager then described, “of course that’s why [Redacted] was called burglar [Redacted] because they knew he was burgling.” A significant agency was acquired and this saw revenue more than double in a short space of time. Diminishing profits and revenues (Figure 6.2) would suggest that this business was not sustainable. This firm employed up to 10 staff in 2007, now employs only 4 FTEs.

It is not difficult to see that evidence of dynamic capabilities processes in Firm J would be hard to find. This proved to be the case. The only argument for the presence of any dynamic capabilities was that the business did search for agencies prompted by the massive drop in revenue experienced

in 2007. As this was due to a dramatic external influence (Figure 7.3), it could be said that this prompted the business to search for survival. This process could be argued was strategic and met the criteria of being one of “asset alignment, opportunity identification, access to critical co-specialised assets” (Teece, 2009, p. 99). The firm-specific asset in Firm J’s case would be the staff familiar with and well networked (Davidsson & Honig, 2003) within the New Zealand oil and gas industry. Firm competencies (Barney, 1991) would be selling such equipment into this industry. As it transpired, the petroleum manufacturing industry experienced a boom from 2007 as Figure 6.3 suggests, providing the opportunity for the business to grow with this new found “technical fitness”. The two red arrows in Figures 6.2 and 6.3 indicate the firm and industry growth curve in the same period. There is no further evidence of dynamic capabilities processes. To verify this, the business was visited, observations made and industry insiders were able to confirm such a conclusion. When asked whether Firm J had a business plan, the long-time general manager replied,

“It still should be in the cupboard down there somewhere.”

This comment suggests that the firm may have had a business plan, but it was not used, updated or reviewed, signalling a lack of strategic intent. Table 7.5 summarises the only evidence of dynamic capabilities for Firm J. Despite this one unsustainable growth event, profitability fell. The business is slowly pulling out of this tailspin, but there is no current evidence that anything other than cutting overheads is achieving this.

Table 7.5 – Firm J dynamic capabilities at the 2007 inflection point.

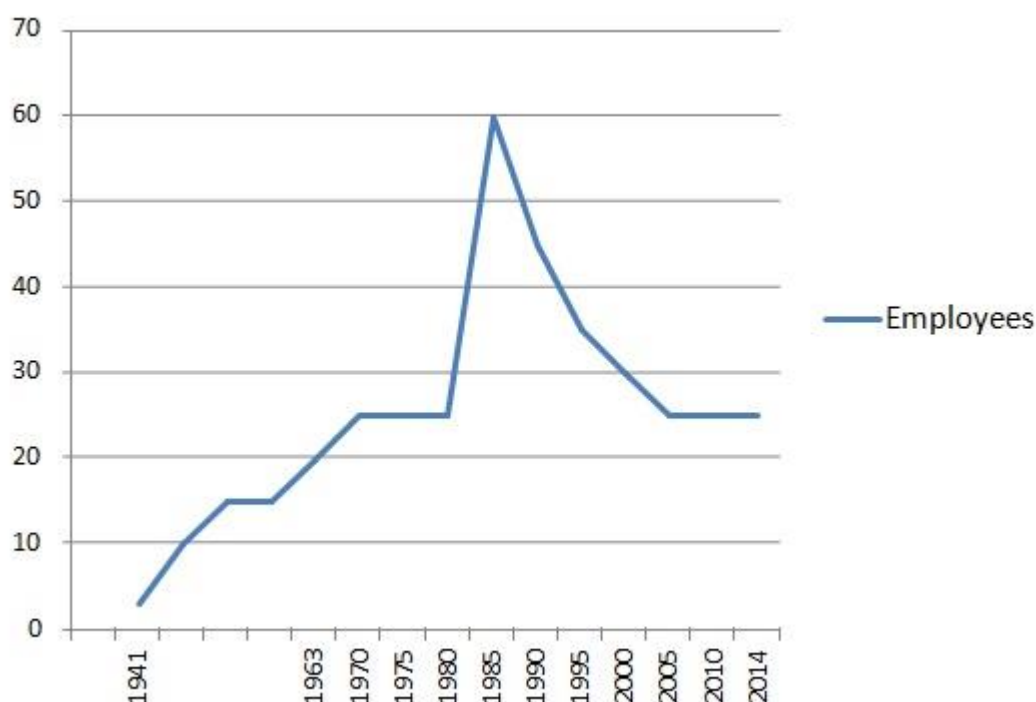
	2007		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Revenue growth		

7.2.3 Firm M – Dynamic capabilities and growth.

Firm M as described in the case study started out in a general engineering industry and deliberately morphed into a specialised fabricator of key energy related equipment. The deliberate part of this change was traced back to the 1960s when the firm acquired some key skills in order to change its product offering from a standard to a more high tech one. This was in response to market conditions

where many competitors were driving profits down. The acquisition of the skills as a result of deliberate (strategic) intent (Hine et al, 2013) to move the business out of the competitive environment it found itself in is the first indication that some form of dynamic capabilities was present. The business successfully managed this transition and found itself in the unique position of being known in the energy industry as a quality fabricator of these high tech items. Figure 7.2 charts Firm M's growth. The second phase of growth can be attributed to the closure of a local rival firm and the subsequent acquisition of many key staff.

Figure 7.2 – Firm M – Growth trajectory and inflection points.



The acquisition of these personnel did not however add to the firm's performance as the period thereafter is described, "the company was then trading more profitability than at the time when (Firm M) employed 60". Through natural attrition the level of personnel decreased as Figure 7.2 suggests. The comment was made that for a period of time profitability was good, this coincided with the development of some more high technology systems for the energy industry. Since 2004, this situation changed. The change was attributed to a new regulation introduced whereupon the industry started to see more imported engineered products enter the market. This began to affect Firm M's profitability negatively.

The negative effect on profit explains more than just a single market influence. The managing director commented,

“the accountant would come here today and think we were nuts really. But we’ve got to keep the price down otherwise more and more will come in from overseas and as I said to you before I’m more interested in keeping the blokes in a job than worrying about the money side of it. And keeping the company going, I’ve spent all my life building [Redacted] (Firm M) up to make [Redacted] all around New Zealand and the Islands and stuff and I don’t want to walk away or shut the thing down just like that otherwise my whole life has been wasted basically.”

This response of the managing director summarises the lack of ability of the firm to not only sense market changes, but to seize the opportunity to change and beyond that and alter its resources to secure a profitable future. The case study describes opportunities presented to the firm to provide a more diversified service, extend its engineered system offering or sell further afield. The lack of a growth response to these opportunities has been described by the managing director as being one where “we just wanted to stay the way we were because one bloke can control 25 staff without too much trouble you see.”

This last statement signals that there was no strategic intent to grow. In fact there has never been a business plan. In order to seek out any evidence of dynamic capabilities, the search in Firm M’s case study revealed the only possible evidence was in the period when the business actively sought out a specialised skillset in order to ensure the long term survival of the business in a highly competitive environment. Whilst the business had some profitable periods, they were soon followed by less profitable ones as Figure 7.4 illustrates. None of these profitable periods were able to be linked to any evidence of strategic intent and nor “formed the basis of study around intentionality: a vision for a sustainable competitive advantage and long term growth” (Hine et al, 2013, p. 14). Table 7.6 summarises the only evidence of dynamic capabilities in Firm M, which coincided with a period of growth. Whilst there was further period of growth from the mid-1980s, this has been attributed to the closure of a larger competitor and acquisition of skilled workers as a result. This growth led to a period of less profitability.

Table 7.6 – Firm M dynamic capabilities at the 1960s inflection point.

	1960's		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Revenue & profitability growth		

7.2.4 Firm N – Dynamic capabilities and growth.

In Firm N's case, two periods of growth are evident. Figure 7.3 illustrates the growth curve of Firm N since inception. The first phase of growth occurred just after the firm was separated from its initial structure. The creation of Firm N, as described in its case study, resulted in a the owner / operators of the "micro" business sensing and seizing an opportunity to offer superior service in an industry in which they were experienced. Table 7.7 summarises the dynamic capabilities from this first period of growth. The ability of the firm to be able to transform its decision making processes when the ownership structure changed enabled a change from a technical resource rich organisation to one where sales and marketing took precedence. This change saw steady growth over several years.

The second phase of growth occurred against the backdrop of a downturn in its market (Figure 7. 3). Similar dynamic capabilities evident in the first phase of growth are evident at this next phase. The growth experienced was counter to the decline in its market as Figure 7.4 illustrates and suggests that Firm N decoupled itself from its reliance in the market opportunity to generate growth. The ability to do so would seem to rely not only on the ability to sense and seize opportunities. The role of the transformational capabilities would seem to play a part in this growth phase. The managing director commented on this phase,

"we were very different in those days to our competitors so we had a huge point of difference. We had good product and we had feet on the ground."

This is the "difference" the managing director attributes the marketing and sales superiority of the firm over its competitors to, as discussed in Firm N's case study. The origin of this point of difference is the change in governance and corresponding injection of capital enabling a focus on the firm's strategic competitive market offering.

Figure 7.3 – Firm N – Growth trajectory and inflection points.



Figure 7.4 – NZ output manufacturing index – 2000-2012 (www.stats.govt.nz/infoshare).

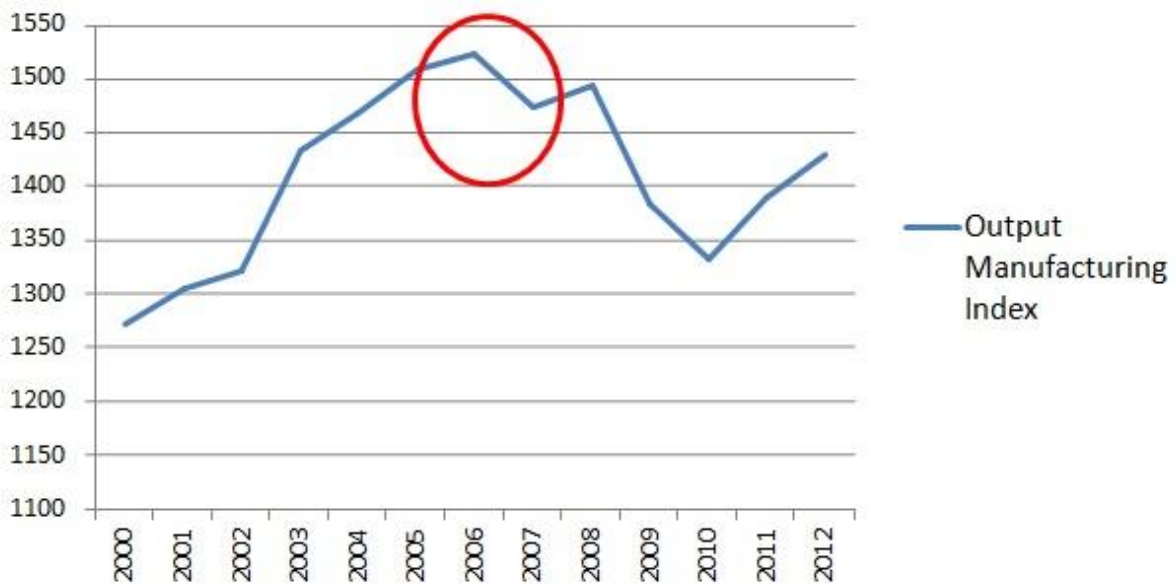


Table 7.7 - Firm N dynamic capabilities at the 1993 inflection point.

	1993		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	X
Business design skills		X	X
Investment allocation skills		X	X
Asset orchestration skills		X	
Growth outcome	Steady growth		

Table 7.8 - Firm N dynamic capabilities at the 2002 inflection point.

	2002		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills			X
Business design skills		X	X
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Accelerated growth		

The problem thereafter as Figure 7.3 suggests is that the firm enjoyed a period of stellar growth that seemed to stall from 2011 when the competitors in Firm N’s marketplace imitated its market offering. The market sensing capability of Firm N appeared to diminish as there was no response to this external influence. Certainly there is no current seizing capability evident, as the managing director admits,

“marketwise we have seen a large number of cheaper products enter the market that nowadays the price is way different but the actual gap in the quality and performance is not huge.”

Firm N exhibited the implementation of dynamic capabilities processes, including transformational ones, prior to growth phases. The managing director recognises the need for this to happen and commented,

“I think in five years’ time it (Firm N) needs to have diversified somewhere, somehow. It will still be doing what it’s doing but it can’t be doing solely what it’s doing unless it shrinks I think, it will need to shrink and possibly it will still be very profitable and would still be a good little business I would say. But for it to grow, which it needs to grow, in five years time it needs to have diversified into something else. It needs someone else running it and it needs a little bit of fresh blood in the sales team and it needs more resource in the service team. One of its big areas of growth will be in service.”

With the aspiration to grow, it would then suggest that the managing director needs to implement a fresh set of dynamic capabilities, particularly transformational ones if evidence from previous phases of growth is observed. It would appear that entrepreneurial motivation (or lack of) is holding this process up (Shane et al, 2003). Renewing the formula for success is required. The subject of dynamic capabilities renewal processes is summarised in Chapter 7.4.

7.2.5 Firm O – Dynamic capabilities and growth.

The many phases of growth as indicated in Figure 7.5 are explained by opportunities the market presented as discussed in Firm O's case study. The notable difference in the initial phase of growth to the latter ones is the transformational nature of the governance structure. Once shareholding was offered to key staff the incentives to perform was an indication of an internal driver to grow. The managing director commented,

“we've tended to offer shareholding to senior people in the organisation, although not a major shareholding but it's, the sort of impact of that was far, well our experience of that was that the impact was far greater than the actual monetary affect in terms of what comes back to them, although the dividend yield's been quite good. The, it's a bit of a status thing, and it's a bit of a sense of ownership thing.”

This has stood Firm O in good stead since 1989 and to this day the demand for shares outstrips supply. The process of intentionally incentivising key managers thus is associated with dynamic capabilities and is consistent with Allesandri et al (2012) who find that managerial stock options motivate managers to pursue actions which promote growth. The dynamic capabilities processes associated with this period of growth are summarised in Table 7.9.

After the Asian Economic Crisis of the late 1990's, the firm experienced a small decline in growth, due to a failed attempt at geographic growth. This attempt was opportunistic and not strategic, the failure of which resulted in the shareholders resolving to “stick to our knitting where we are.” The firm then grew rapidly. A period of little growth followed in 2003 to 2008 which once again is attributed to no growth in existing market demand. This is confirmed by the large dip in oil and gas production from 2002 to 2008 (Venture Taranaki, 2015). Nevertheless, during this period, Firm O implemented structural (transformational) changes associated with reviewing business strategy. Table 7.10 summarises these dynamic capabilities processes. This allowed the business to take advantage of the next productive opportunity when it arose, this time, intentional (and planned) increasing geographic reach and thence growth.

Figure 7.5 – Firm O – Growth trajectory and inflection points.



Table 7.9 - Firm O dynamic capabilities at the 1989 inflection point.

	1989		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	X
Business design skills		X	X
Investment allocation skills		X	X
Asset orchestration skills		X	
Growth outcome	Rapid profitable growth		

Table 7.10 - Firm O dynamic capabilities at the 2004 inflection point.

	2004		
	Sense	Seize	Transform
Learning and knowledge skills			X
Governance skills			
Business design skills		X	
Investment allocation skills			X
Asset orchestration skills		X	X
Growth outcome	Revenue growth		

Table 7.11 - Firm O dynamic capabilities at the 2011 inflection point.

	2011		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Geographic growth		

The last phase of growth from 2011 occurred at a time when the shareholders recruited a marketing focused chief executive officer. The goal was for the senior shareholders to step back from the business and allow someone else to take the business forward. This plan did not work as internal limitations in the business, namely managers sitting on the board, prevented the CEO from implementing the changes required for further growth. As the managing director commented about this result,

“It just didn’t seem to work and also yeah it affected the culture.”

Internal limitations to growth now became evident as the aspiration to grow was dampened. The managing director himself answers a question about his aspiration to grow thus,

“No. No, I don’t. Let me qualify that. I aspire to grow probably to not much more than 100. I don’t have any (aspiration to grow), and I don’t think the board has any appetite for it being, you know, 250 people or anything like that. I think it’s the right size for the New Zealand industry at the moment”

This comment supports the notion that the limitation to growth may be management related, not market related. When there is an unwillingness of intent to grow, opportunities are missed and hence this managerial influence becomes a limitation to growth (Hine et al, 2013; Penrose, 2009 (1959)). If the path to profitability through strategic intent is necessary for sustainable growth (Davidsson et al, 2009) then Firm O would appear to be on a path of unsustainable growth. Presently the “the shareholders won’t have a dividend for a while.” Firm O is responding to an external opportunity in seeking business offshore, however, this would appear to be due to an internal related link rather than strategic intent as articulated in a business plan, as there is none. In Firm O’s case, the path to sustainable growth would appear to have been identified from 1989 and again in 2004. Yet in 2011 due to the firm’s internal limitation, it could be concluded that Firm O is an example of a firm undertaking a path of unsustainable growth.

7.2.6 Discussion on firms exhibiting unsustainable growth.

This section on the analysis of dynamic capabilities of firms which exhibit unsustainable growth provides the case study rigor required by providing a “negative instance” through “constant comparisons” (Yin, 2010). Whilst the five firms detailed above all exhibit some form of growth, it was erratic at best and certainly does not appear to be sustainable. These firms had an opportunity at some stage of their growth trajectory to secure a profitable and hence sustainable outcome (Davidsson et al, 2009; Schumpeter, 1947; Teece, Pisano, & Shuen, 2000; Teece, 2009). The opportunity to do so represents a “productive opportunity” (Penrose, 2009 (1959)). Despite this, none of these firms appeared to have recently captured this profitable opportunity. This does not mean, bar Firm G, now in administration, that the firm has lost all opportunity to return to sustained growth. The periods of profitability all the above firms experienced were not necessarily intended. The only firm above to have an active business plan, the articulation of intent, was Firm O.

In the above examples, favourable market conditions underpinned periods of growth and, at certain periods, temporary profitability. Looking at these cases it is possible to understand that a firm’s growth is subject to many varied influences, external and internal. Dynamic capabilities are concerned with the internal ability of the firm to sense and seize internal and external opportunities and transform its internal resources to ensure long-run success.

Analysis of growth inflection points of Firms G, J, M, N, and O illustrate growth uncertainty where sensing and seizing capabilities are evident at the commencement of significant growth phases of the firm. It is only Firms N and O that exhibit transformational capabilities at periods, not necessarily associated with favourable market conditions. In 1989 and 2004, Firm O implemented a number of transformational processes such as those relating to governance and incentives, learning and knowledge management and changing the business model. In these periods, despite adverse market conditions, the firm continued to grow profitably. Firm N grew profitably in contrast to its industry index. Prior to this, transformational capabilities were evident. Firm M’s managing director recognises the need to implement resource transformational processes to counter the current malaise (in terms of growth and profitability) in contrast to the market opportunities. The same could be said for Firm O, where the managing director having built the business up now aspires to not to grow (and retire).

Firms J, M and G did not exhibit any transformational capabilities. They had temporary periods of revenue or FTE growth, often not profitable. Without the profits required for sustainable growth (Davidsson et al, 2009) when the firm encountered a crisis or change in market conditions, there was an inevitable decline in firm revenue and size. It would appear then from these examples that a

paucity of dynamic capabilities are associated with uncertain growth trajectories. The question of how dynamic capabilities affect firm growth is far from answered however. The comparison with firms that exhibit sustainable growth is useful in this instance to clarify this supposition. The next section details the analysis of dynamic capabilities at inflection points along the trajectories of firms that exhibit sustainable (profitable) growth.

7.3 Firms exhibiting sustainable growth.

Firms in the unsustainable growth category as described in Chapter 7.2, may have shown growth at stages in their existence which has not been sustained. These firms have recently exhibited a decline in their size or revenue. This decline, whether due to the economic environment, managerial limitation or strategic limitation, provides an opportunity to analyse the firm's dynamic capabilities. Analysis of the case studies reveal that some of the firms exhibit sustainable growth despite the negative influence of market conditions. Figure 4.1 illustrates a key driver of the investment in the energy industry in New Zealand: the imported price of oil and petroleum having an effect on the imports of steel pipe used in the New Zealand oil and gas industry. As this pipe is an indicator of related project work and hence investment, it represents the opportunities afforded to engineering firms operating in the industry.

Chapter 4 describes this relationship in further detail. Firms A, F, I, K and L grew for a period, yet declined recently. However, the main difference between them and firms discussed in 7.2 are that these firms improved their profitability. This establishment of the "profitable opportunity" in the face of declining external or market opportunities indicates these firms have responded such that further sustained growth is possible. Firms B, D, E, H and P grew consistently over time despite some periods of market decline. The opportunity then exists to see whether dynamic capabilities have had an influence on this outcome. Firms A, B, D, E, F, H, I, K, L and P are examined for evidence of dynamic capabilities at certain inflection points, described below. Results of all case studies are summarised in Appendix D as per Table 5.3.

7.3.1 Firm A – Dynamic capabilities and growth.

Initially Firm A was categorised as a firm exhibiting unsustainable growth as from 2012-2013 the firm experienced a downturn in market conditions and downsized as Figure 7.6 illustrates. The downsizing was intentional due to sensing market conditions as being unfavourable due to "the roll on effect of no more wind generation and no more geothermal as all the projects put on hold due to oversupply

of generation” (CEO of Firm A), and adjusting accordingly. The nuance is that if evolutionary fit processes associated with dynamic capabilities lead to an improvement in profitability, despite negative growth and are motivated by strategic intent, then Firm A’s growth could be considered sustainable. Firm A used this opportunity to change its governance structure. The ability to do this (i.e. seize) is attributed to its collegial ownership structure. The CEO commented that the governance and operational structure,

“tends to give me my focus for non admin time as there is a fair chunk of admin running the company these days. It doesn’t necessarily mean it’s just me doing everything because the directors take responsibility for doing things.”

Firm A started out with a few specialist engineers getting together to provide a service to a limited customer base. When its main customer shed technical staff, Firm A grew with this market growth opportunity. After considering whether the key capabilities of this first phase of growth were able to deliver a long term growth capacity through change in resources (specialised skills), it was concluded that the processes associated with this growth did not meet the evolutionary fitness criteria (Helfat et al, 2007) by not being intentional nor “created”, “modified” or “extended” existing resources. Thus the processes could not be categorised as being dynamic. Nonetheless, Firm A increased in FTEs as resources became available. From 2000 the company was able to seize some market opportunities and join with a couple of other engineering consultancies. The merger brought further specialised resources into the firm enabling it to expand geographically. The dynamic capabilities evident at this period are summarised in Table 7.12.

Figure 7.6 – Firm A – Growth trajectory and inflection points.

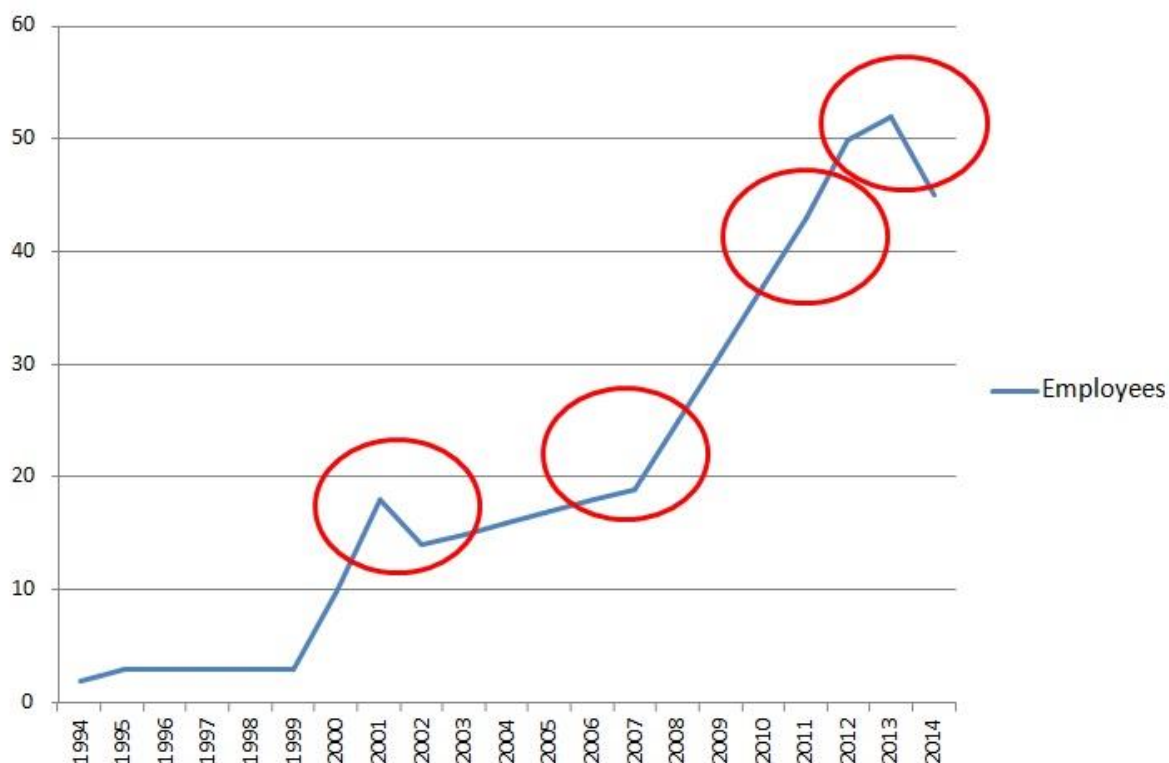


Table 7.12 - Firm A dynamic capabilities at the 2000 inflection point.

	2000		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Rapid revenue growth		

A small drop in size in 2002 was followed by a steady period of growth. In 2003 key staff were allowed to buy shares in the business. This was brought about through internal pressures as the CEO commented,

“it all became too much for the guy who was running it he was trying to be the chief designer and over-viewer of the juniors plus run the business plus do the billing plus chase bad debts and do everything else and he had health issues and he had to step down.”

As this change in management was reactionary, and not strategic, no internal sensing capabilities were evident. Nonetheless, the firm was able to seize on this opportunity to incentivise key staff, engender loyalty amongst them, reallocate investments and orchestrate assets which certainly contributed to the evolutionary fitness of Firm A. Table 7.13 summarises these dynamic capabilities.

Table 7.13 - Firm A dynamic capabilities at the 2003 inflection point.

	2003		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills		X	
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Steady growth		

After this period of steady growth, the business size warranted more of a formal management structure and an industry experienced person was brought in. The motivation to do so was the internal recognition of the complexities that firm growth brought and subsequent ability to seize the opportunity to bring in a resource to provide structure and direction. The ability of the firm to prevent the “leadership crisis” (Greiner, 1998 {1972}) having a detrimental effect on growth is attributed to sensing and seizing capabilities. The result commenced a process of key firm resource transformation, namely networking (learning), allocation of key firm skills towards growth oriented pursuits (diversifying the customer base and strategic acquisitions) and directing of key firm skills (asset orchestration). The dynamic capabilities evident at this period are summarised in Table 7.14.

Table 7.14 - Firm A dynamic capabilities at the 2008-2010 inflection point.

	2008-2010		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	
Business design skills		X	
Investment allocation skills		X	X
Asset orchestration skills		X	X
Growth outcome	Accelerated profitable growth		

More recently, there is evidence of the firm responding to the changing market conditions by firstly sensing them and transforming its resources to better position themselves for offshore business opportunities (Table 7.15).

Table 7.15 - Firm A dynamic capabilities at the 2013 inflection point.

	2013		
	Sense	Seize	Transform
Learning and knowledge skills	X		X
Governance skills			
Business design skills			
Investment allocation skills			X
Asset orchestration skills			X
Growth outcome	Greater geographic growth		

7.3.2 Firm F – Dynamic capabilities and growth.

Through an established network and drive to own its own firm combined with an opportunity led the owners of Firm F to start up. The first years were characterised by the owners operating in the business in a manner typical of the creative stage of growth (Greiner, 1998 {1972}). Figure 7.7 illustrates Firm F’s growth trajectory. Inflection points along the firm’s growth trajectory are explored for evidence of dynamic capabilities related processes.

Figure 7.7 – Firm F – Growth trajectory and inflection points.



Firm F’s market is largely concerned with pipework for the energy and utilities industries. Its growth when mapped against a key indicator of the industry’s fortunes, total imported pipe (Figure 4.1) illustrates how the peaks (2006 and 2012) and troughs (2003 and 2010) of Firm F’s growth line up

with those of the New Zealand pipeline industry. The industry demand from periods 2004 to 2008 in particular presented a market growth opportunity for Firm F. Firm F appeared to capture this opportunity as the managing director describes,

“we were confident of what we could do and we knew the timing so we just did it”, “so they will invite you for the next tenders and that’s pretty much for a lot of jobs. If you don’t screw it up you are allowed back. Make one cock up and you are out and it’s long climbing back up. And so we did go after things and we did them well and we just all worked together and made it work.”

Whilst Firm F’s “technical fitness” contributed to the outcome described above, it was the “evolutionary fitness” in the form of dynamic capabilities processes that were associated with the ability of the firm to capture this opportunity. The firm established a unique mechanism for pipe modifications in the field in 2006, thereby enabling the firm in “selecting enterprise boundaries” and controlling platforms. Firm F also sought external advice on business processes and established a staff incentive program. These processes are associated with sensing and seizing capabilities. There are three periods of growth identified that are examined for evidence of processes associated with dynamic capabilities. These are summarised in Tables 7.16, 7.17 and 7.18. These summarise evidence of dynamic capabilities at certain points of a firm’s growth curve.

Table 7.16 - Firm F dynamic capabilities at the 1998-2000 inflection point.

	1998-2000		
	Sense	Seize	Transform
Learning and knowledge skills	X		
Governance skills			
Business design skills			
Investment allocation skills			
Asset orchestration skills			
Growth outcome	Steady firm growth in revenue and personnel.		

Table 7.17 - Firm F dynamic capabilities at the 2006 inflection point.

	2006		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	
Business design skills		X	
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Greater profitability and accelerated growth.		

Table 7.18 - Firm F dynamic capabilities at the 2010-2012 inflection point.

	2010-2012		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	X
Business design skills		X	X
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Greater customer base and product / service offering and financial independence.		

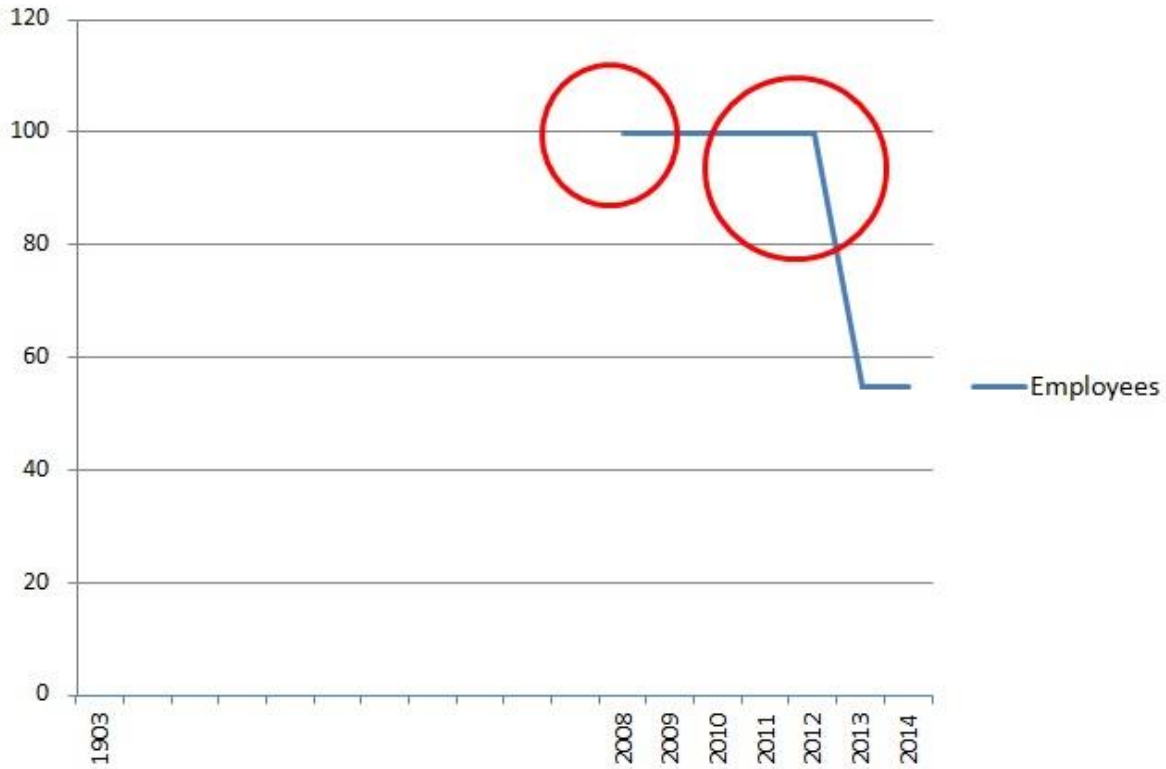
Firm F continued along a profitable path despite a decline in external growth opportunities (GFC). As the managing director commented after the GFC period (2010-2012) the firm has, “got a pretty lazy balance sheet really. We don’t owe the bank any money.” Through these three periods of growth there is evidence of strong sensing capabilities. The business was able to renew its strategic competitive offering by seizing the opportunities presented to it. Importantly, Firm F was able to transform certain resources, whether it was ownership (governance), business structure (business model) or creating a culture of looking for new technologies (knowledge and learning).

This rather contradictory result of the business maintaining performance (profits or otherwise) despite a decline in business size raises the opportunity to discuss the role of dynamic capabilities renewal, discussed in 7.3. The productive opportunity rendered to the firm because of its profitable state would appear indicate it is on a sustainable growth trajectory despite the number of FTEs declining.

7.3.3 Firm I – Dynamic capabilities and growth.

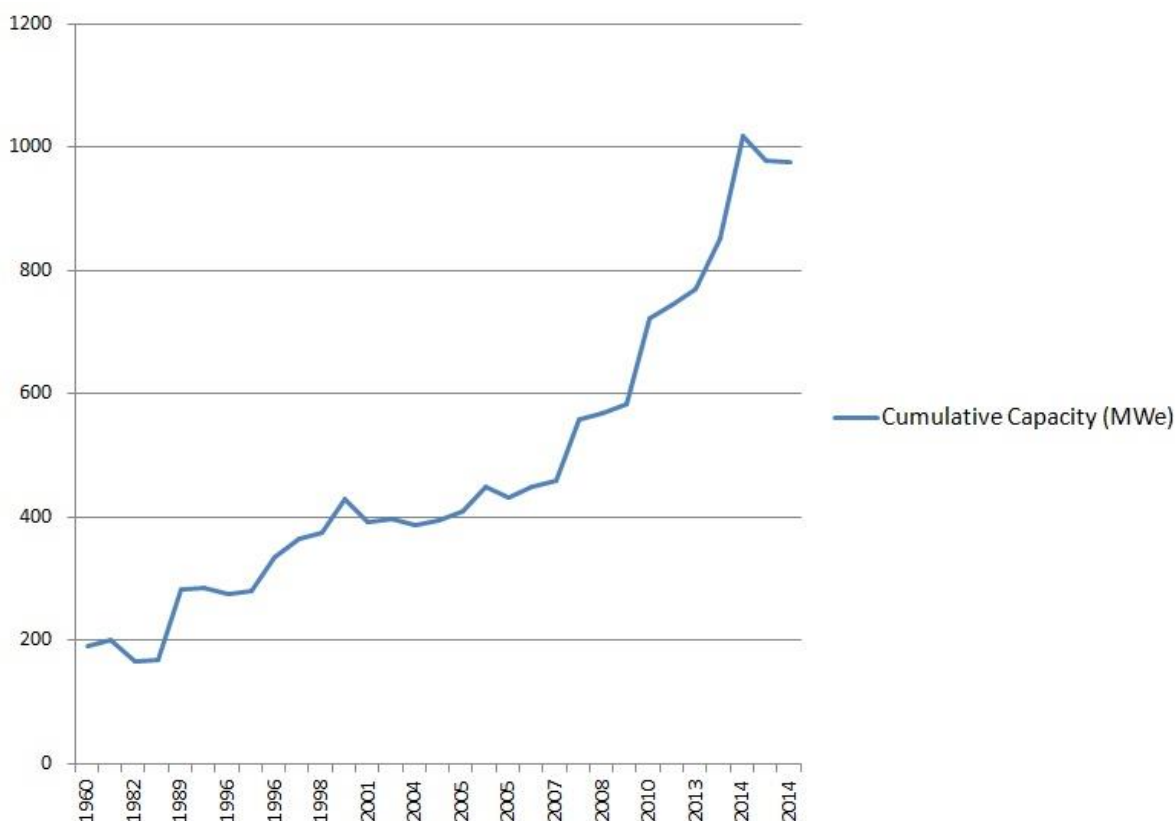
Figure 7.8 illustrates Firm I’s growth trajectory that exhibits no employee growth over time and latterly a decline in size. Firm I had been manufacturing the same product in New Zealand with the same methods in volumes determined by the marketplace since the 1980’s. As a New Zealand owned Trans-Tasman business, the firm participated and benefited from various booms in the infrastructure industry in particular the resources boom in Australia, yet as a business it did not appear to grow over a period of time.

Figure 7.8 – Firm I – Growth trajectory and inflection points.



In 2000, the firm was bought by a large diversified and privately owned conglomerate whose motivation was to realise the value of the real estate the business was on instead of the business itself. The early 2000's came as a surprise to the owners as growth in a number of industries including the geothermal energy helped the firm improve its financial performance. As a market growth index, the growth in New Zealand Giga-watt hours (GWH) of geothermal generation, illustrates this “market growth opportunity” (Figure 7.9).

Figure 7.9 – Growth in NZ geothermal power production – NZ Geothermal Association - http://www.nzgeothermal.org.nz/elec_geo.html.



Whilst the market provided the opportunity for Firm I to perform better financially, the firm did not necessarily grow in FTEs. The current CEO describes the change in how the owners looked at the business as, “going from being in that move to close the business down, a gradual closure of the business into one of seeing a future to the business”.

Exploring the matter at the interview and from firm publications, it became apparent that Firm I was able to take advantage of the opportunity presented of favourable market conditions by virtue of its technical fitness (Helfat et al, 2007). The evidence included the fact that there were no business plans until 2010. A new CEO with global experience was employed in 2010 and set about transforming Firm I into one with a future. Evidence of dynamic capabilities emerged after this period, but not immediately.

In 2010, Firm I implemented a number of key processes aligned with the key management skills associated with dynamic capabilities. These included processes to incentivise senior management where previously there were none. Barriers between management and personnel were broken down and a process of production improvement based on continuous learning was implemented. In 2011, the business implemented processes associated with focusing on target markets, innovation and

changing customer needs. This led to a review in 2012 of the Australian business that was then sold. The result was improved profitability as the CEO commented, *“the numbers are fantastic. If you just took any profitability measure, profitability has increased significantly in the last four years.”*

Firm I exhibited a decline in employee numbers through intentional divestment, resulting in improved profitability. Divestment that has been identified as a result of an “active divestment policy” is as feasible as a merger or acquisition policy for growth (Kay, 2002). As a result, resources are freed up to focus on the “productive opportunity” (Penrose, 2009 (1959)). In this case this mechanism realises the importance of profitability that is a key pre-requisite to sustainable growth (Davidsson et al, 2009; Schumpeter, 1947).

The CEO sums up the results of changes from 2010 to 2012, “I think within that (improved profitability) is a huge increase in business resilience and reduction in risk of the business going out of business”. As profitability is a measure of growth, the dynamic capabilities associated with this growth (through divestment) are: sensing market opportunities; seizing loyalty, boundaries, decision making protocols and business model; and the transformative dynamic capabilities evident are knowledge and governance. Table 7.19 summarises this evidence at the identified period in the firm’s growth curve.

Table 7.19 - Firm I dynamic capabilities at the 2010-2012 inflection point.

	2010-2012		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	X
Business design skills		X	X
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Improved profitability.		

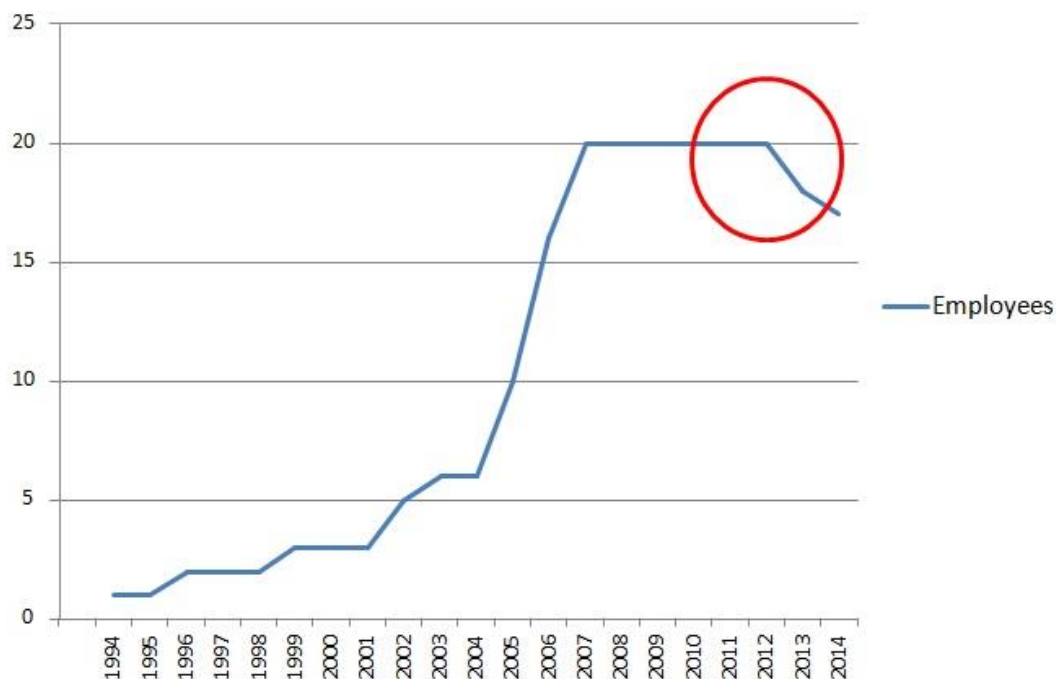
7.3.4 Firm K – Dynamic capabilities and growth.

The managing director of Firm K, a specialised engineering consultancy in the energy industry, recognised the importance of transformative capabilities and comments on the investment of time, money and effort into establishing a new marketing direction, “what we do today is an enabler to allow us to get those profits.” Like Firm I, Firm K’s growth from inception to about 2009 was attributed to favourable market conditions with a steady group of customers as indicated above in Figure 7.9,

the market growth phase corresponding in the firm's growth as Figure 7.10 illustrates. The managing director commented,

"if you look at our clients list in general our client list delivers 80% of our projects are clients we've been with for 15 or 20 years."

Figure 7.10 – Firm K – Growth trajectory and inflection points.



Less market or “demand” side growth opportunities were available to Firm K from 2010, presenting an external threat to growth. At the same time, the firm did show evidence of sensing capabilities and subsequently seizing the opportunities presented to it. Resources were redirected (extended) within the business to expand geographic reach by investing in offshore networks and pursuing related opportunities. The dynamic capabilities associated with the geographic growth of the firm are summarised in Table 7.20.

Table 7.20 - Firm K dynamic capabilities at the 2009 - 2010 inflection point.

	2009 - 2010		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	
Business design skills			
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Greater geographic reach.		

Firm K’s strategic competitive advantage over its rivals in the New Zealand energy industry was based on inimitable engineering skills as the managing director commented, “our guys would eat most of our clients for breakfast.” As Firm K sensed its growth, previously reliant on market side demand, was threatened due to the change in its market, the firm set about actively seeking offshore opportunities. As the managing director commented,

“we’ve been marketing in Asia for four years and we are hoping in the next few weeks we will finally get one of them in the door”, to the point that Firm K is, *“internationally known through Asia, through the Philippines, Indonesia and Kenya for our expertise and currently we are in the final stages of negotiating three contracts, three very large contracts for us in Indonesia and the Philippines that have taken a couple of years.”*

This meant the mix of its main resources: inimitable engineering skill-sets, no longer offered a locally applicable competitive advantage. Firm K responded by acquiring market development skills, redirected existing resources and proceeded to developed several offshore marketing opportunities. The firm intentionally downsized by shrinking its FTEs to seventeen and in the process improved profitability. The next phase of growth involved identifying and hiring a person to undertake business development functions, not only looking for external opportunities, but importantly looking at improving internal opportunities. Interestingly, the ability to sense the internal opportunity to alter the way the business was run (governance) and then how the firm invested in its resources was a precursor to seizing internal opportunities and realising profitable opportunities. Table 7.21 and 7.22 illustrate the dynamic capabilities at this period.

Table 7.21 - Firm K dynamic capabilities at the 2011 inflection point.

	2011		
	Sense	Seize	Transform
Learning and knowledge skills	X		X
Governance skills		X	X
Business design skills			X
Investment allocation skills			X
Asset orchestration skills			X
Growth outcome	Greater geographic reach and profitability.		

Firm K has appeared to grow, then decline in size. The decline in size though was intentional as New Zealand opportunities diminished the firm seized the opportunity to (according to the managing director) retain its “above average profit.” Firm K sought out sustainable growth through adapting to a dynamic external environment (or threat) indicates dynamic capabilities are present (Loasby, 2010).

Table 7.22 - Firm K dynamic capabilities at the 2012 inflection point.

	2012		
	Sense	Seize	Transform
Learning and knowledge skills			X
Governance skills			X
Business design skills		X	X
Investment allocation skills			
Asset orchestration skills			
Growth outcome	Greater profitability.		

Like Firm F above, the growth curves are deceiving. By changing how the firm views the marketplace, or “recalibrating” its outlook through transformational processes, it has increased its “productive opportunity” to seek out profitable work. In so doing it has also improved its own profitability.

7.3.5 Firm L – Dynamic capabilities and growth.

The theme of favourable market conditions presenting a productive opportunity once again emerges in the case of Firm L. Firm L’s growth curve is illustrated by Figure 6.6 in Chapter 6. Against the backdrop of its primary market (Figure 4.1), Firm L had some indifferent growth. Initially, the opportunity to grow on the back of local industry demand was presented, later followed by a decline in opportunities. Firm L responded by diversifying, both in service offering and geographic reach. The managing director sums up the recognition of this challenge,

“the oil industry per se is too small in New Zealand for a company to survive solely on their opportunities. We looked at lots of others. We went to the dairy industry but we were just a price check in the dairy industry and we did some work for them, perfectly alright but the dairy industry is an old boys’ network.”

The ability to sense this limitation in the market and the consequent actions are summarised in Table 7.23. The business did not show evidence of any transformative dynamic capabilities at this period. As Figure 6.6 illustrates, Firm L did not grow for some time due to the limited opportunities in New Zealand in the industry, however, the managing director had spent time and effort marketing in Australia and elsewhere. After establishing an engineering strategic competitive advantage through designing and building world leading equipment, Firm L started to secure work offshore. This work and a pick up in the local industry fuelled the growth phase from 2008 onwards. It was only after Firm L was seeing the effects of a decline did the business start to change structurally. A board was established, diversified assets were invested in and a succession plan implemented. Dynamic capabilities associated with these changes are summarised in Table 7.24. After these significant changes to the business, the managing director suggests the firm have “got a great growth phase ahead.”

Table 7.23 - Firm L dynamic capabilities at the 2002 inflection point.

	2002		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Accelerated geographic growth.		

Table 7.24 - Firm L dynamic capabilities at the 2012 – 2-13 inflection point.

	2012 - 2013		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	X
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Services growth and moderate increase in profits.		

That Firm L’s ability to take advantage of the market demand / or “demand side” of firm growth (Marris, 2002) is attributed to its sensing and seizing capabilities. The managing director describes this growth phase,

“we are now into the dairy industry, but that’s only because the dairy industry in New Zealand is just going through the roof. All the plants are upsizing.”

The firm’s transformational capabilities are only observed once the firm is in a situation of crisis, where the market does not offer any exogenous growth opportunities. Growth as a result of the firm responding to external threats is exhibited here (Kay, 2002), albeit only diversification and profit improvement despite the decline in FTEs.

7.3.6 Firm B – Dynamic capabilities and growth.

Firm B is a New Zealand SME, started as an opportunity spun off from another firm, Firm H. This firm is analysed for evidence of dynamic capabilities below. Firm B is clearly in the creative phase of growth as the managing director seeks to create a market with flexible responses to the market forces (Greiner, 1998 {1972}). Figure 6.1 (Chapter 6) illustrates Firm B’s growth trajectory. Fortunately, the managing director is acutely aware that as the required processes for growth become more complex, he needs to bring in a set of skills accordingly,

“I have really tried to push (to employ) for guys who are more problem solvers that take ownership of their role.”

The set of processes characterising the firm’s growth and corresponding with the firm’s growth trajectory is summarised in Table 7.25.

Table 7.25 - Firm B dynamic capabilities at the 2008 inflection point.

	2008		
	Sense	Seize	Transform
Learning and knowledge skills	X		
Governance skills			
Business design skills			
Investment allocation skills			
Asset orchestration skills			
Growth outcome	Steady growth.		

From the start-up phase of the business, from when Firm H divested (a growth mechanism), Firm B exhibited a strong sensing capability, particularly the ability to sense the marketplace opportunities. Whilst the ability to seize the opportunity would be a logical assumption, the evidence from the

research cases detail processes associated with this set of seizing capabilities reside in Firm H, not Firm B. The managing director of Firm B, the “entrepreneur” had strong networks (Granovetter, 2005) that derived strong network capital (Davidsson & Honig, 2003) and learning processes (Deakins & Wyper, 2010). The network resources and entrepreneurial orientation (Quince & Whittaker, 2003) of Firm B’s owner is evident as he understands the New Zealand advantage,

“especially New Zealand because there’s a lot of small business so you are often dealing direct, it’s very easy to get in touch with the owner. Even the larger construction companies are still run by owner-operators so it’s very easy to talk to people. So most of the work I get is through those sorts of connections.”

From 2012, growth accelerated as the firm became an established entity in its marketplace. The ability to seize opportunities became more pronounced as the firm grew. From 2014, the ownership structure changed such that the incentive to grow promised the managing director further reward through the possibility of selling. He commented on his ambition for growing the firm, “being able to chase other opportunities and get systems in place. I guess that’s probably what it is, the growth of the business to be able to provide me with more free time and less stress I guess.” This shift in growth incentive from pure growth to one of attending to the lifestyle aspiration of the (now) sole owner according to the theory that firms grow more when their size is below the owner’s aspired level (Greve, 2008). Through the transformation of the ownership structure and the incentives by which the firm is managed have contributed to profitable growth. The inflection points of Firm B’s growth curve have been analysed for evidence of dynamic capabilities. Table 7.26 summarises how the firm’s ability to firstly sense and then seize on a market opportunity accelerated growth. But it is only once the firm’s business model and governance structure were intentionally transformed as summarised by Table 7.27 did growth and profitability accelerate even further.

Table 7.26 - Firm B dynamic capabilities at the 2012 inflection point.

	2012		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Accelerated growth.		

Table 7.27 - Firm B dynamic capabilities at the 2014 inflection point.

	2014		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	X
Business design skills			X
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Accelerated growth and profitability.		

7.3.7 Firm D – Dynamic capabilities and growth.

Firm D was started by an experienced industry personality after he sold his previous firm. The experiential knowledge contained within the owner was crucial to the initial stages of Firm D’s growth. There was undoubtedly a strong link between market orientation (Foley & Fahy, 2009), courtesy of the experiential knowledge (Politis, 2005), and firm performance as the managing director suggests,

“within 12 months we were back into all the businesses or business platforms that we were originally in for the previous 40 years. Following that we had an expectation that business would fall through the door because everybody knew us and it took us nearly two years before the market really recognised us and it wasn’t what we were good at, it was the fact of the time lag that it took to get the company accepted and approved as a viable supplier of products and services. So whilst we were recognised we could do it you had to go through the approval processes so that delayed our income stream and lagged it for about two years.”

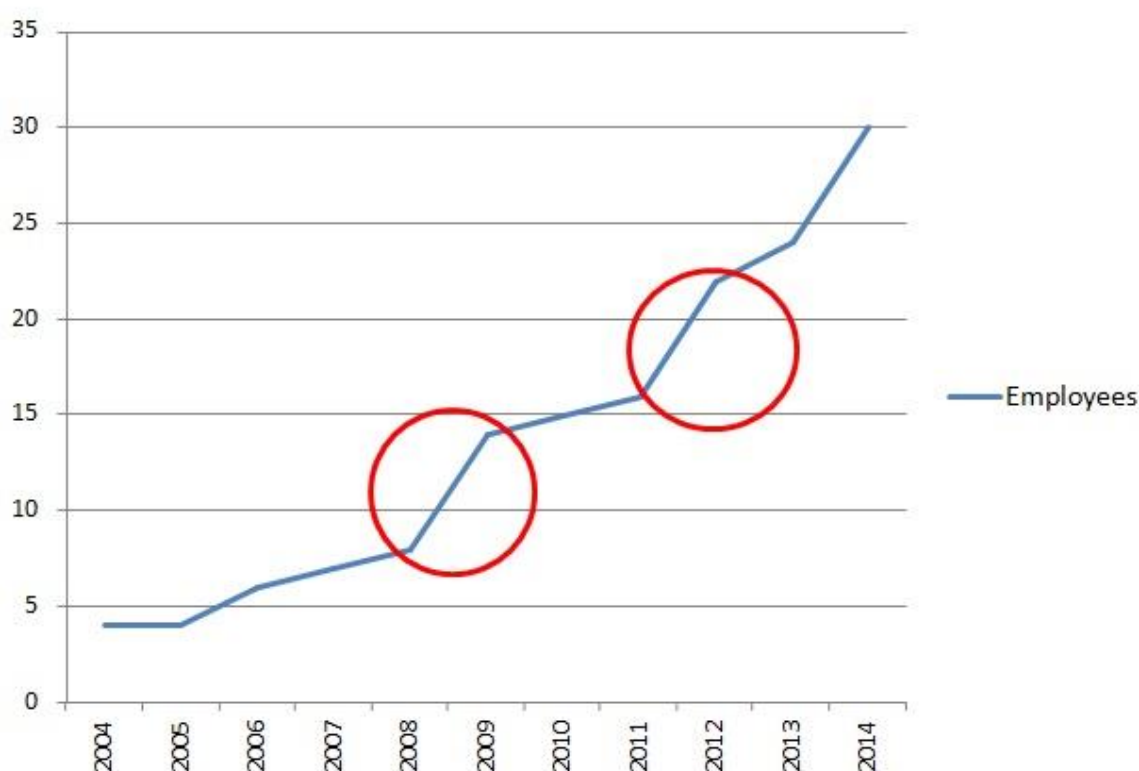
Table 7.28 summarises these learning capabilities, identified in sensing and transformative processes as the company culture of learning was driven by the entrepreneur. Figure 7.11 illustrates Firm D’s growth trajectory. Growth accelerated once the size of the firm allowed resources to be transformed to seize market opportunities.

Table 7.28 - Firm D dynamic capabilities at the 2003 inflection point.

	2003		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	X
Business design skills			X
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Steady growth.		

With this critical mass achieved and the firm able to hire managers with process experience to implement systems necessary to seize market opportunities, the firm became profitable. The conclusions able to be drawn here include the phase of growth transitioning from a creative to a directional phase without experiencing a leadership crisis (Greiner, 1998 {1972}). The ability of the entrepreneur of this SME to sense the need to transform his established resources in order to seize internal productive opportunities to in turn capture market growth opportunities is found to be evident at the 2009 inflection of growth.

Figure 7.11 – Firm D – Growth trajectory and inflection points.



Once the firm achieved a size that can be recognised as the directional phase of growth, the focus on business processes has contributed to success with blue chip energy clients. The dynamic capabilities associated with this phase are summarised in Table 7.29. As the managing director commented, *“we’ve changed the governance in a huge manner. Part of becoming the provider of engineering services to people like [Redacted], [Redacted] and [Redacted] has meant that we’ve had to have check and balances. Part of the QA thing is that we’ve had to do manufacturing bills of materials, we’ve had to write procedures.”*

Importantly this change to the business was followed by an increase in profits.

Table 7.29 - Firm D dynamic capabilities at the 2009 inflection point.

	2009		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills		X	X
Business design skills			X
Investment allocation skills		X	
Asset orchestration skills		X	X
Growth outcome	Accelerated growth and profitability.		

7.3.8 Firm E – Dynamic capabilities and growth.

After several years of operating a small team of contractors in the Australasian energy industry, the ability of the managing director of Firm E to sense an opportunity to learn a specialist engineering system in 1997 set itself up for a period of steady growth (Chapter 6 – Figure 6.4). Dynamic capabilities evident at this point are summarised in Table 7.30. The opportunity was not thrust upon the firm, it was the innate and proven ability of the firm through its entrepreneurial resource which satisfied the evolutionary fitness requirement of altering its resources and contributing to the firm’s medium and longer term revenue streams (Helfat et al, 2007). The resultant growth was steady and moderately profitable, setting the business up for further growth, as the managing director commented,

“so yeah just getting a licence (to apply the specialised engineering system) was quite an asset and we finally did that”, “and the whole world sort of changed over-night.”

Table 7.30 - Firm E dynamic capabilities at the 1997 inflection point.

	1997		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills			
Business design skills		X	
Investment allocation skills			
Asset orchestration skills		X	
Growth outcome	Steady profitable growth.		

Further changes in governance, business structure and asset deployment followed in 2000, identified as seizing capabilities (see Appendix D) and summarised in Table 7.31. Importantly, the transformational capabilities in evidence at that period were behind these changes as the firm offered shareholding to key staff, relocated the head office to where the epicentre of work was and

set about forming mobile teams to undertake remote work. A period of steady profitable growth followed. This period is also synonymous with the growth in the resource sector in Australasia. The firm was able to grow profitably through market opportunities presented to it. Importantly Firm E was in a strong position to seize these opportunities.

Table 7.31 - Firm E dynamic capabilities at the 2000 inflection point.

	2000		
	Sense	Seize	Transform
Learning and knowledge skills		X	X
Governance skills		X	X
Business design skills		X	X
Investment allocation skills			X
Asset orchestration skills		X	X
Growth outcome	Steady profitable growth.		

The sustainability of Firm E’s growth could have been questioned in 2009, where a massive drop in business attributed to the global financial crisis threatened its very existence. The managing director laments his response to all the signs of the drop in business,

“I didn’t realise, well I guess I had my head in the sand and hoped that it wasn’t going to be as serious as it was and I kept a lot of people employed that I should have laid off.”

Fortunately through sheer will and determination he managed to survive the crisis and emerge stronger as Figure 7.16 illustrates. It was after this experience that the managing director then changed the business again. With expansion clearly described now as “deliberate growth”, Firm E intentionally brought on experienced marketing skills in the form of a mentor. This reinforced the learning capabilities of the firm, both sensing and seizing capabilities associated with this key management skill. An expansion of geographic area in which the firm operated required a change in the way the firm was structured. With marketing work being undertaken by the managing director in order to grow the business a strong administrative skill was required. The managing director brought on an experienced accountant who took up a shareholding in the business. The dynamic capabilities associated with this period of growth are summarised in Table 7.32. It is worth noting that these changes were not undertaken overnight, but over a couple of years.

Table 7.32 - Firm E dynamic capabilities at the 2010 - 2013 inflection point.

	2010 - 2013		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	X
Business design skills			X
Investment allocation skills		X	X
Asset orchestration skills		X	
Growth outcome	Accelerated growth.		

7.3.9 Firm H – Dynamic capabilities and growth.

“I’m bit of an oddity in this industry, maybe a bit more than a bit that I’ve got a business background and while university will give you a lot of theory and stuff, no-one ever, ever prepares you for running a small business,” (managing director, Firm H).

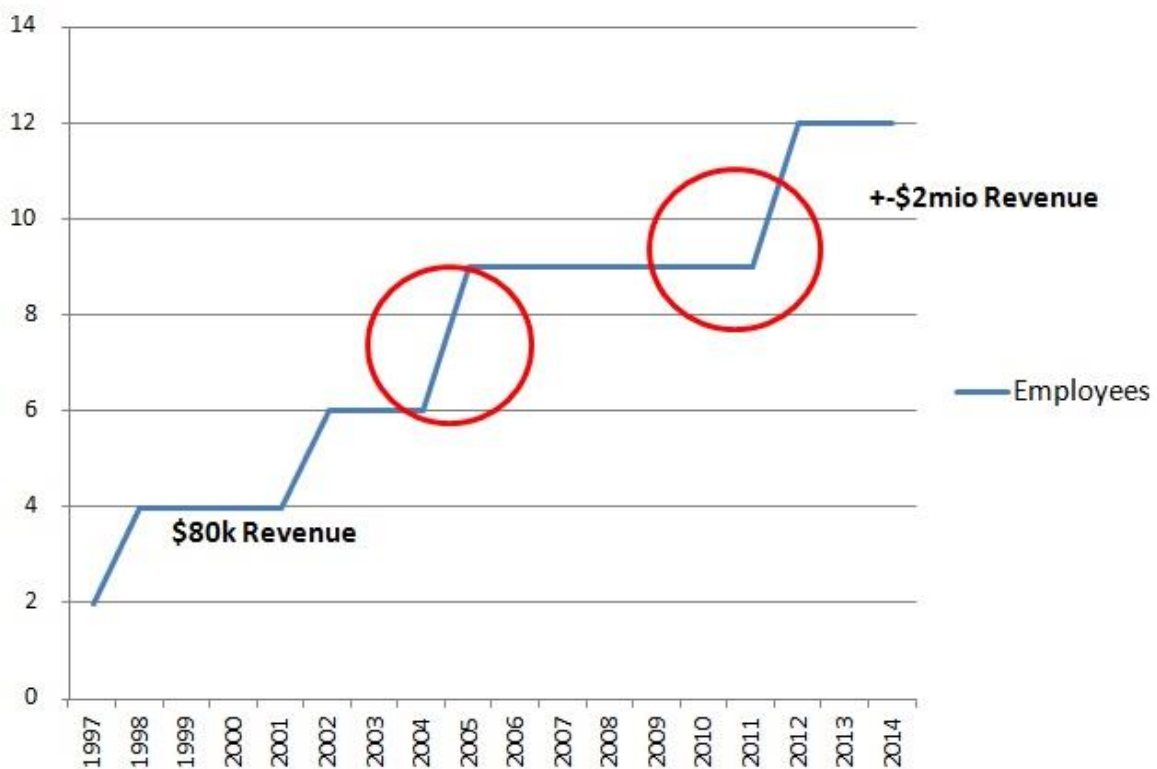
Whilst the unusual manner in which the managing director came to own Firm H is more one of fortune than design, the result was that an educated, experienced and worldly wise skill set happened to guide the firm through steady growth as shown in Figure 7.12. This gave the firm, barely more than a start-up, direction from the outset. Further examination of the firm’s processes reveals a well resourced one. As the managing director summarises when asked about possessing a business plan, *“always had one so it’s getting smaller and simpler and we’re a tighter focus than it used to be that I’d have a strategic plan, a management plan and daily work schedule. I’ve found that now it’s very simple, a couple of pages, a review of where we’re going, what we’re doing.”*

The statement above summarises the extent to which Firm H’s resources reside in the deliberate direction the managing director imparts upon the business. Firm H’s case study provides a good example of how a firm is able to seamlessly traverse two evolutionary phases, namely creativity and direction (Greiner, 1998 {1972}) without the challenges of the tumultuous revolutionary (crisis) phases. This is because the firm exhibits a strong entrepreneurial learning capability as summarised in Table 7.33. This is attributed to the managing director’s experience and learning capabilities contributing to the strong entrepreneurial knowledge capability (Politis, 2005). Through the flexible business model established early on in its existence, Firm H is able to scale up its resources as required.

Table 7.33 - Firm H dynamic capabilities at the 2002 inflection point.

	2002		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	X
Governance skills		X	X
Business design skills		X	X
Investment allocation skills		X	X
Asset orchestration skills		X	X
Growth outcome	Steady growth.		

Figure 7.12 – Firm H – Growth trajectory and inflection points.



In 2008, Firm H recognised through its inherent strong sensing heuristic (Bingham & Eisenhardt, 2011) that work it was required to undertake strayed from its core competencies (Barney, 1991). The processes evident from this point centred on intentionally altering the firm’s business model to “extend” existing resources, by protecting them from being dissipated, resulting in the “spin-off”, creating Firm B. Table 7.34 summarises these extended (or renewed) series of dynamic capabilities.

Firm H demonstrates that having the capability to sense these changing environments and the capability to seize the change, dynamic capabilities are present (Teece, 2010).

Table 7.34 - Firm H dynamic capabilities at the 2008 inflection point.

	2008		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills			
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Increased growth.		

Profitability and investment in the firm were constant “one of the hard things is a balance of funds to find across the board growth” (managing director of Firm H). Firm H was able to seize a market opportunity, when it emerged, by acquiring a rival. The motivation to do so was to remove this rival from the marketplace. This response to an external threat is a Penrosian growth mechanism (Kay, 2002). But it is the ability of the firm to respond through sensing the threat (opportunity) and having the firm architecture and capability (financial) to seize on this to secure and eventually grow its market.

Firm H is led by an experienced entrepreneur, whose ability to learn adds a significant sensing capability to the firm’s set of dynamic capabilities. Sensing capabilities are synonymous with knowledge management and learning skills. These skills precede the ability of a firm to successfully transfer knowledge within Firm H (Zander & Kogut, 1995). As an example, the managing director suggests that,

“it’s just that constant looking at right across the board on everything that we do, the reason to believe in us and what it is that our clients need and what can we do for our client that they have faith in us, whether it’s modern equipment, well trained staff, comprehensive health and safety requirements so everything comes back to what gives our clients faith in us.”

With evidence of these strong sensing, seizing and transformational capabilities from the inception of Firm H, through the key management skills and the growth trajectory as illustrated in Figure 7.12, it would be possible to suggest that Firm H is on the path to sustainable growth.

7.3.10 Firm P – Dynamic capabilities and growth.

From humble beginnings 150 years ago, Firm P has a history in New Zealand, and now Australia, worthy of writing a book about. Nonetheless, this study is only interested in the last 20 years of Firm P's significant history. The firm's growth significantly accelerated after a tumultuous period of change from a regional family business to one owned by a multinational capital investment firm and thence to New Zealand private ownership. This is despite changes in market opportunities as Figure 4.1 suggests. Figure 7.13 illustrates this more recent period. When the private investors, a core group of ex-employees, took over in the mid 90's, the firm was so broke it encouraged "all the drivers to bring back all the tea bags they could from motels," as the managing director concluded, "that's how bad it was."

This case study offers insight into what a firm is required to do internally to grow. Today the firm is a multimillion dollar one with up to 1200 employees in New Zealand and Australia. The internal processes implemented after the current owners took over included learning processes as the managing director suggests,

"what we have done is made available to all the managers the ability to go on a lot of things like leadership management courses, training, that type of thing."

From the mid 1990s the firm formed relationships with a series of advisors and established a business model conducive for scale based growth, through its branches, or in Penrosian terms; multiple resource linkages, market bases, multiple sources of linkages, related-linked expansion and collaborative activity (Kay, 2002). Despite being financially constrained, Firm P managed to grow rapidly into a profitable concern through strong sensing and seizing capabilities as summarised in Table 7.35. This set of dynamic capabilities was evident at the start of Firm P's growth from being nearly bankrupt in the mid 1990's.

From the early 2000s, growth increased. At this stage, changes to the governance structure were evident with an external director being brought onto the board. A management incentive scheme was instituted. This was not implemented in an "ad hoc" manner, and it is evident that this process is "evolutionary fit" (Helfat et al, 2007) as the managing director commented,

"we've put ten per cent of the shares in the operational business for the management. Now we're looking at changing that partly because it's clear to them that they won't end up with any control of the business and all they are going to get is dividend", "we're changing things now and it's going more financial reward. So you achieve your target here then you will get extra money. So I would say generally speaking they get paid a reasonable base salary and most of the normal perks, they've all got cars obviously or whatever and have superannuation, subsidised superannuation."

As the firm grew, this changed, signalling a strong internal sensing capability from that point on. The firm’s ability to seize this opportunity, and transform operational resources through incentivising key management (Loasby, 2010) leads itself to shaping the applicable dynamic capabilities (Easterby-Smith et al, 2009).

Figure 7.13 – Firm P – Growth trajectory and inflection points.



Table 7.35 - Firm P dynamic capabilities at the 1996 inflection point.

	1996		
	Sense	Seize	Transform
Learning and knowledge skills	X	X	
Governance skills		X	
Business design skills		X	
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Steady growth.		

The governance and business design skills delivering the seizing and transforming dynamic capabilities evident from 2000 onwards are evident as changes such as the incentive changes described above illustrate. Table 7.36 summarises these dynamic capabilities from 2000.

Table 7.36 - Firm P dynamic capabilities at the 2000 inflection point.

	2000		
	Sense	Seize	Transform
Learning and knowledge skills		X	
Governance skills		X	X
Business design skills		X	X
Investment allocation skills		X	
Asset orchestration skills		X	
Growth outcome	Increased growth.		

Further changes to the resources of the business were undertaken with the removal of the head office structure from the operational structure. The offices themselves are operated as a separate legal entity. This decision was strategically intentional, driven from a desire to grow to support the shareholders and growth as part of the firm’s continuous plans.

“we looked at it and thought we have kicked around some time the idea of removing ourselves directly from the operational area if you like and that was in conjunction with our plan to keep on developing CEOs because we thought well we can’t put CEOs in charge of a business and then sit in the same office” (managing director Firm P).

These changes set the firm structure in a path of relentless growth through the acquisition mechanism and having the capability to identify opportunities in the marketplace. These transformational processes, that modified existing resources are illustrated in Table 7.37.

Table 7.37 - Firm P dynamic capabilities at the 2002-2008 inflection point.

	2002 - 2008		
	Sense	Seize	Transform
Learning and knowledge skills			X
Governance skills			X
Business design skills			X
Investment allocation skills			X
Asset orchestration skills			X
Growth outcome	Accelerated growth.		

In summing up on the story of Firm P’s intentions, the managing director commented, “we’re looking at the international side of the business and one of the key plans we have there is to expand that greatly.” The evidence from Figure 7.18, along with the intended growth and the identified dynamic capabilities processes strongly suggest that Firm P is one that exhibits sustainable growth.

7.3.11 Discussion on firms exhibiting sustainable growth.

In disassembling data presented in this chapter as per the five phase cycle (Yin, 2010), it can be concluded that the firms presented in 7.3 exhibit sustainable growth. All the interviewees of the firms in this section expressed an aspiration to grow. The growth curves of all of these firms are overwhelmingly positive, despite at some stages they declined, like Firm E, where a sharp decline from 2009-2011 was soon followed by a sharp period of growth. Most importantly, the firms in this chapter, over time grew profitably. The various managing directors / owners and CEOs interviewed all articulated one way or another, their motivation for growing the firm, mostly to support a future aspiration of attaining financial security. As profits are the precursor to achieving this goal (Penrose, 2009 (1959)) it is surprising to see that the motivation to realise this security is largely manifested in reinvesting their available profits into the business and not taking them out for personal financial use. Firm L's managing director commented that "if we think we can self-fund it (growth) we will." This obsession to see the business grow, with the help of reinvested profits might be one area where Penrose's theory and the dynamic nature of the resource scarce SME's growth diverge, where the owner realising a personal financial gain (the "profit motive"). The objective now is to reassemble the data (Yin, 2010) to elicit a meaningful discussion which may or may not help answer the research questions. The dynamic capabilities processes identified at the growth inflection points, indicated by the red circles in the firms' growth curves, have been coded and tabled. These tables are useful as a yardstick with which to measure how prevalent these firms' dynamic capabilities are when associated to the growth of the firm. But it is the sustainable performance over time which is considered through the analysis of the firms discussed in this chapter.

If sustainable growth is dependent on profitable growth (Davidsson et al, 2009), and profitable growth is sustained through profitable innovation (Nelson & Winter, 1982), then it is no surprise that that firms which intentionally pursue profitable innovations tend to be more profitable (Teece, 1986; Teece, 2006). Firm F's case study provides such an example, where in 2006 the firm invented a locally relevant variant of an engineering system which outperformed its rivals. Firm L did the same in 2002. These innovations, brought about through strong sensing and seizing capabilities provided a competitive advantage for a period. Naturally the larger the firm, the more resources it possesses to be able to render a more capable profitable innovation regime. Firm C is case in point where its "high tech" division, whilst smaller in revenue, outperforms (Figure 2.9) its traditional business in terms of growth. This does not mean that Firm C does not need to have well developed sensing, seizing and transforming capabilities. As can be seen in Firm P, size does matter, a conclusion Green & Agarwal (2011) reach when discussing profitability of firms in the face of adverse economic environments.

Yet as in Firm F and L's case, implementing dynamic capabilities processes at certain points along the firm's growth trajectory does not provide a competitive advantage in perpetuity, as market demands change and competitors imitate, this advantage is lost over time. The question of whether regular renewal of dynamic capabilities offers the firm a sustainable advantage remains unanswered.

7.4 Dynamic capabilities renewal processes and growth.

7.4.1 Introduction.

As a firm encounters changing external opportunities and threats, its incumbent factors of its success thus far become increasingly redundant, in a way, similar to product lifecycles (Stark, 2011). A firm that possesses abilities to foresee, identify and respond in such a way as to refresh its factors of success possesses strategic renewal capabilities. The fourth research question is posed to answer the question of whether the renewal of dynamic capabilities influences firm growth. As the dynamic capabilities concept is a viable strategic methodology, particularly related to the design and learning schools (Mintzberg & Lampel, 1999), it a useful construct to examine how firms renew their competitive position in the face of changing marketplaces through the ability to learn and reconfigure key resources (Teece & Pisano, 1994). The renewal processes rely on the intentionality of the reconfiguration process (Helfat et al, 2007; Helfat & Peteraf, 2003; Zollo & Winter, 2002). Renewal of strategic attributes of a firm; attributes which derive for the firm a "productive opportunity", are process oriented (Ambrosini et al, 2009). Evidence of intentional, regular or timely implementation of dynamic capabilities' processes is sought along the case studies' growth trajectories.

As mentioned in Chapter 3, a firm that strategically renews or refreshes itself would demonstrate learning and knowledge management organisational skills (Teece & Pisano, 1994), possibly in response to internal stress and inertia (Huff, Huff, & Thomas, 1992). It is not only a "once off" transformation of resources that are considered. Firms that experience a limited lifecycle of resource effectiveness either succeed in reconfiguring their resources or not. In many of the case studies, the firms illustrate inflection points in positive (or negative growth) which coincide with a similar change in market conditions, reflecting the "market demand" effect (Marris, 2002). But the cases of interest are those that reveal an intentional reconfiguration of resources in the face of a change in exogenous conditions.

For example, Firm J (7.1.2, Figure 7.3) did not exhibit a sustainable growth trajectory over time and when the firm experienced a negative growth opportunity, it was unable to reconfigure (or transform) its key resources to create a "productive opportunity" (Penrose, 2009 (1959)). On the

other hand, Firm I (7.1.1, Figure 7.1) was able to transform its resources and whilst the number of FTEs shrank, the firm was able to improve its profitability, a precursor to sustainable growth. These are examples of where one firm did not exhibit any transformational capabilities (Firm J) at an inflection point and the other (Firm I) did. In order to seek out evidence of dynamic capabilities renewal, more evidence than just a change in resources is required. The creation, extending and modifying of resources previously created, extended or modified, in response to the sensed changes in economic environment represent a renewal of dynamic capabilities.

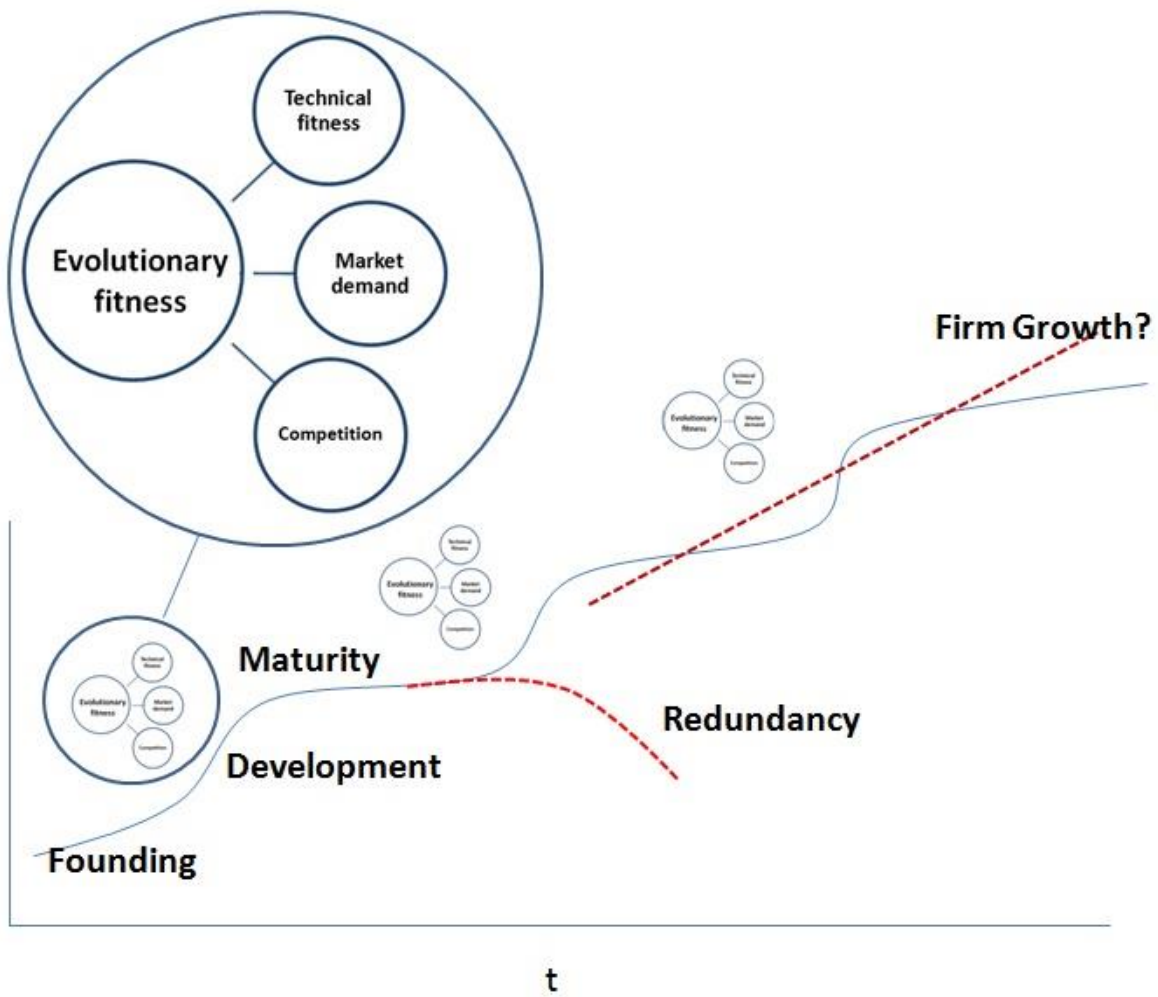
Strategies for the development of new firm capabilities also include reconfiguring the very resources they are derived from (Wernerfelt, 1984). Lecler & Kinghorn (2014) suggest that renewal is involved with “noticing environmental changes and being able to link them to strategy and to modify the relationship” (p. 67). Therefore dynamic capabilities renewal includes identifying internal opportunities to modify when the environment changes. Renewal of firm capabilities is also not an immediate process, as it involves modifying firm strategy over time (Lecler & Kinghorn, 2014), and requires the ability of the firm to be,

“continually reappraising the profitability of their different activities as changes occur in external conditions,” (Penrose, 2009 (1959), p. 157).

In this section the observations sought are those in which case study firms identify the changing marketplace and formulate a plan to head off or productively respond to threats or opportunities through reconfiguring or transforming key resources. The inflection point at which this may have an effect on growth trajectories is examined to see if this has had an impact on sustainable growth.

In Chapter 3, the dynamic capabilities renewal process concept was discussed. To illustrate how this concept is investigated to see if the renewal process had any influence of firm growth, Figure 3.6 was developed to Figure 7.14 illustrating the new iteration of dynamic capabilities in Helfat et al’s (2007) evolutionary fitness terms. As the growth categories suggest (Table 7.2), some firms are considered as growing sustainably, others unsustainably. Despite firms exhibiting unsustainable growth having only exhibited minor isolated dynamic capabilities (Chapter 7.1), they are examined for dynamic capabilities renewal as this is a relatively new area of research and comparisons contribute to the rigor of the research (Eisenhardt, 1991). Once again, diagrams are used to develop relationships to illustrate the empirical argument of the research (Eisenhardt & Graebner, 2007). The firm growth trajectories are transposed on their pre-dominant industry index and the dynamic capabilities are summarised at the growth inflection points.

Figure 7.14 - The theoretical effect of dynamic capabilities renewal on firm growth - Based on Helfat & Peteraf's (2003, p.1005) capability lifecycle.

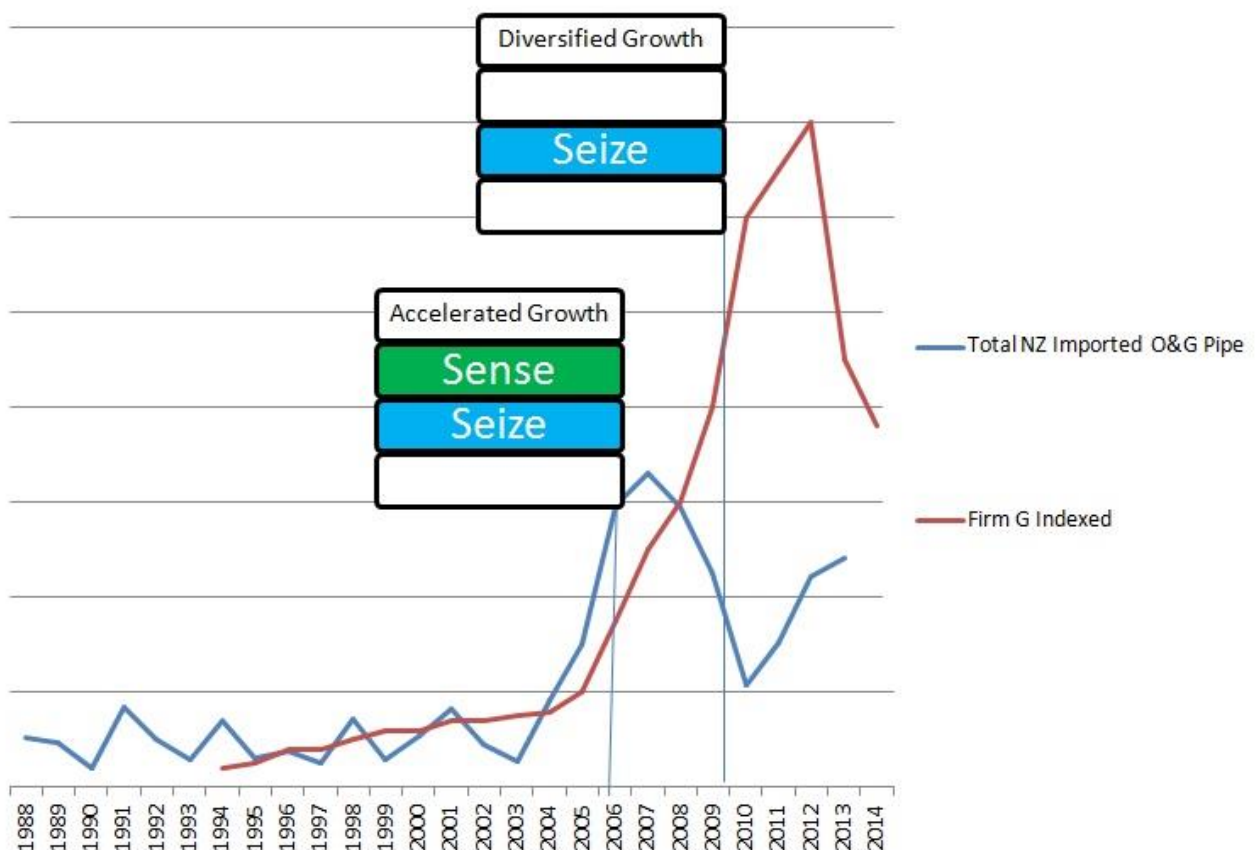


7.4.2 Dynamic capabilities' renewal for firms exhibiting unsustainable growth.

The firms examined in Chapter 7.1 namely; G, J, M, N and O exhibited dynamic capabilities at various growth related inflection points.

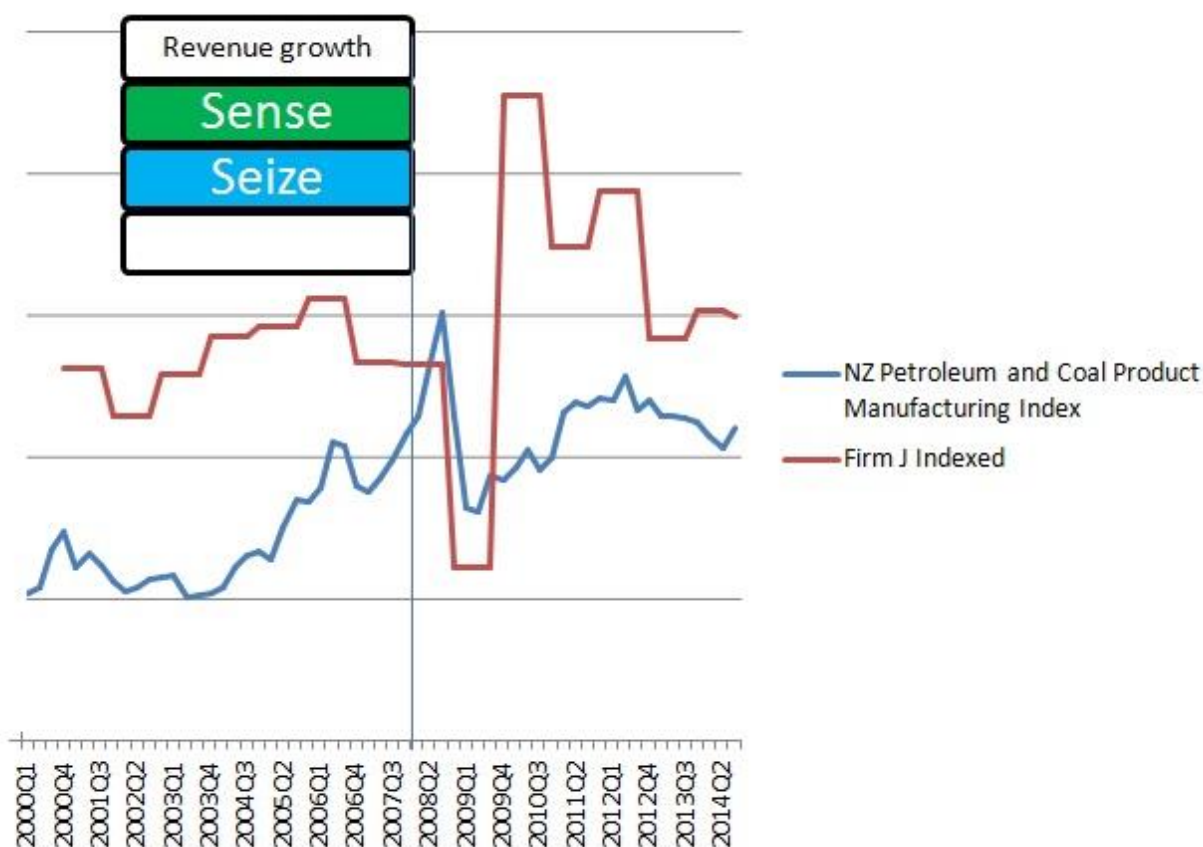
Firm G's growth trajectory exhibits two inflection points, at which dynamic capabilities are evident (Figure 7.15). The first inflection point sees Firm G capture a growth opportunity through the ability to sense the market growth opportunity and seize this by acquiring key industry knowledge skills, adjust its business model and realign assets towards this market opportunity. The second point contains no evidence of sensing capabilities / learning skills yet the business is able to seize an opportunity to grow by diversifying its services. Despite possessing this dynamic capability, when faced with adverse market conditions, Firm G was unable to transform its resources. The general manager commented on the managing director's inability to sense the challenges faced by the business, "he basically is head up his arse and not seeing the bigger picture."

Figure 7.15 – Firm G growth trajectory, industry index and dynamic capabilities at inflection points.



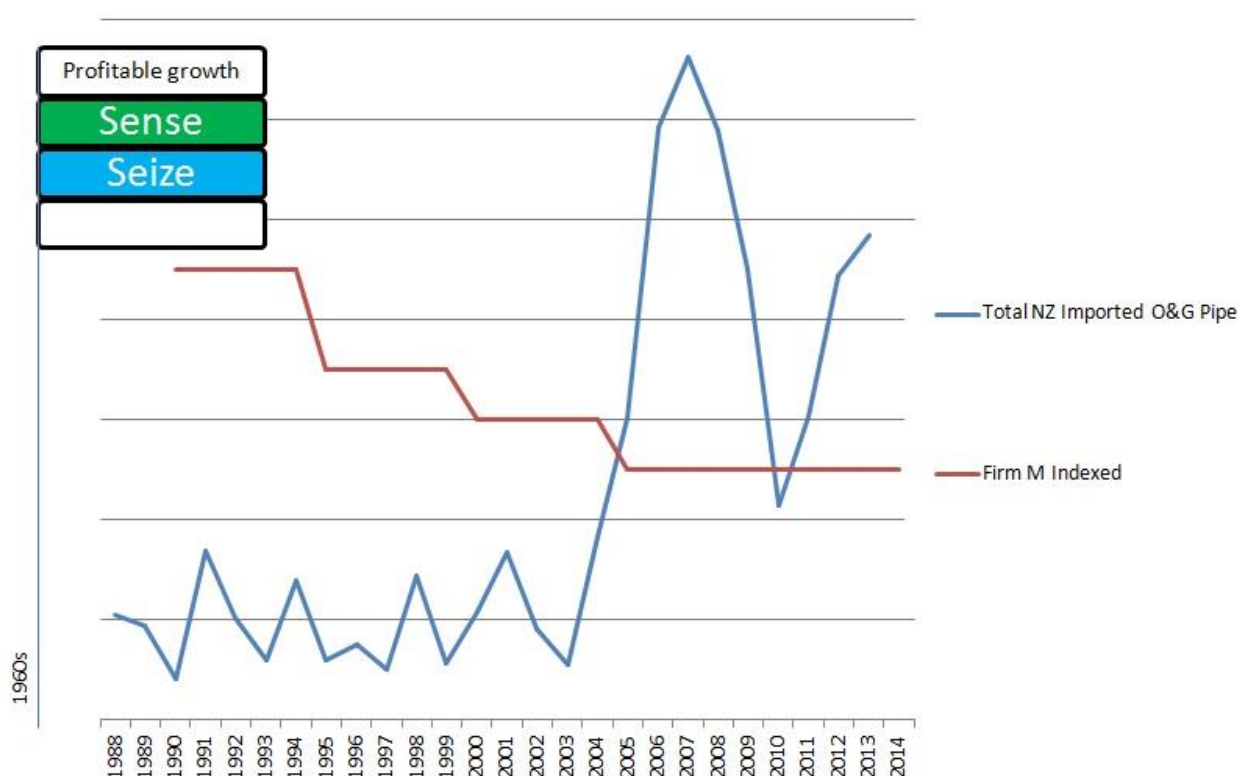
Firm J’s growth trajectory (Figure 7.16) is relatively flat until 2007/2008 when the industry saw a massive decline. Spurred into action, the general manager leveraged off existing networks to establish a key agency to supply increased product into this industry. This saw immediate revenue increase but was not sustained, despite an increase in market demand. The networks were neither well managed nor prioritised. The lack of internal capabilities post 2008, is evident as the general manager commented, “we had had an exclusive agreement with [Redacted] and when that evaporated and along with that million and a half average I guess turnover, we really struggled”; and struggle it did for years afterwards. At the 2007/2008 inflection point only sensing and seizing capabilities were present.

Figure 7.16 – Firm J growth trajectory, industry index and dynamic capabilities at inflection points.



Firm M’s case included evidence only at the relative beginning of the enterprise, in 1960, when the firm recognised that it was not making money out of a commoditised product and deliberately moved to producing a product with a high technology component. Limited growth ensued. Subsequently, no further dynamic capabilities were evident. Nor was any further growth, despite the market offering growth opportunities (Figure 7.17). Profitability increased after this 1960 inflection point, thereafter varied over the years and more recently declined as the managing director suggests, “the accountant would come here today and think we were nuts.”

Figure 7.17 – Firm M growth trajectory, industry index and dynamic capabilities at inflection points.

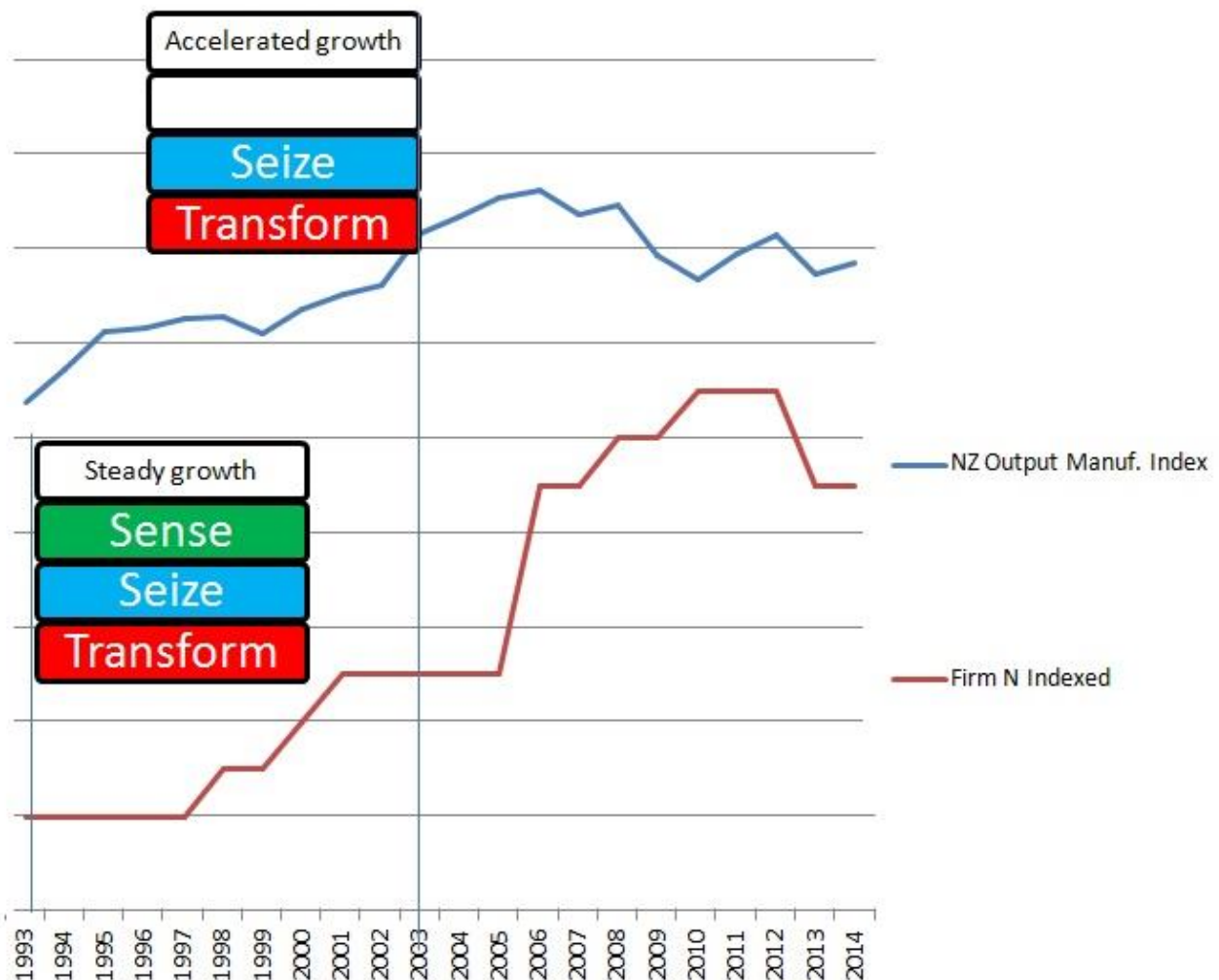


As opposed to the firms above, Firm N starts out with some direction and evidence of dynamic capabilities. Yet latterly the strategic intent and growth is stagnant. Early evidence of dynamic capabilities saw the firm leverage its limited resources to capture a market opportunity. Importantly these dynamic capabilities were also transformational and saw the firm grow steadily (and profitably) for 10 years as Figure 7.18 illustrates. In the face of a declining market Firm N restructured its resources and grew dramatically. The motivation to transform its limited resources was strategic. By 2011 a key business partner had exited the business. The market has also changed. For example,

competitors were imitating Firm N’s service offering. The managing director admits changes need to occur,

“We haven’t adapted with different product, no. We’ve stuck to our guns and we have developed with some of our suppliers’ slightly different ideas and products to reduce the cost of them. But we are still in most levels of the market, if we are not the most expensive.”

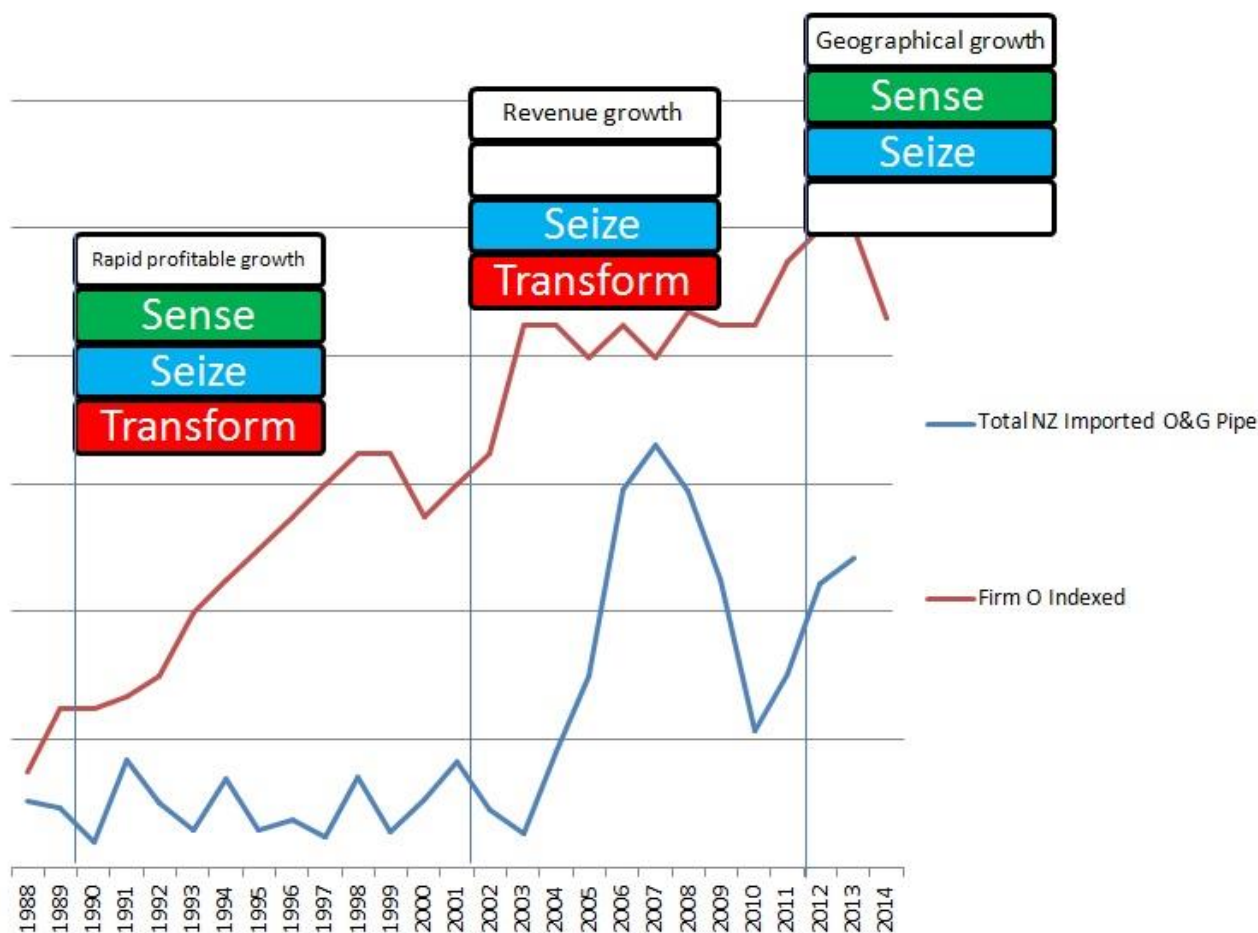
Figure 7.18 – Firm N growth trajectory, industry index and dynamic capabilities at inflection points.



Firm O has an impressive track record as a specialist firm in the energy industry with relatively consistent growth over time in the face of several downturns in the marketplace it operates in. Its track record of growth from 2 staff to over 100 at a recent point in time (Figure 7.19) includes several inflection points where dynamic capabilities were identified. The initial phase of growth included sensing, seizing and transformational dynamic capabilities. At the 1989 inflection point dynamic capabilities were evident at the start of a long period of profitable growth. When the firm was faced

with the Asian Crisis in the late 1990's, the response was reactionary and not intentional nor strategic. Following the Asian Crisis growth declined until market driven growth saw Firm O grow. The firm then embarked upon several growth initiatives, initially not strategic, but then with a strong sensing capability it was able to seize geographic opportunities in its existing field. Further to this Firm O was able to realign recruiting and marketing resources to take advantage of regional opportunities. With the industry in New Zealand slowing down, Firm O was able to maintain its size through this geographic growth opportunity. Modest growth was experienced after 2008. However, the next inflection point failed to show evidence of transformational capabilities whilst growth declined. No strategic intent is evident at this point as the managing director summarises his intentions, *"to retire at some stage and I'd like to realise the fruits of my labours other than just, you know, and frankly the best way to do that for an organisation like this, is to sell it as a going concern."*

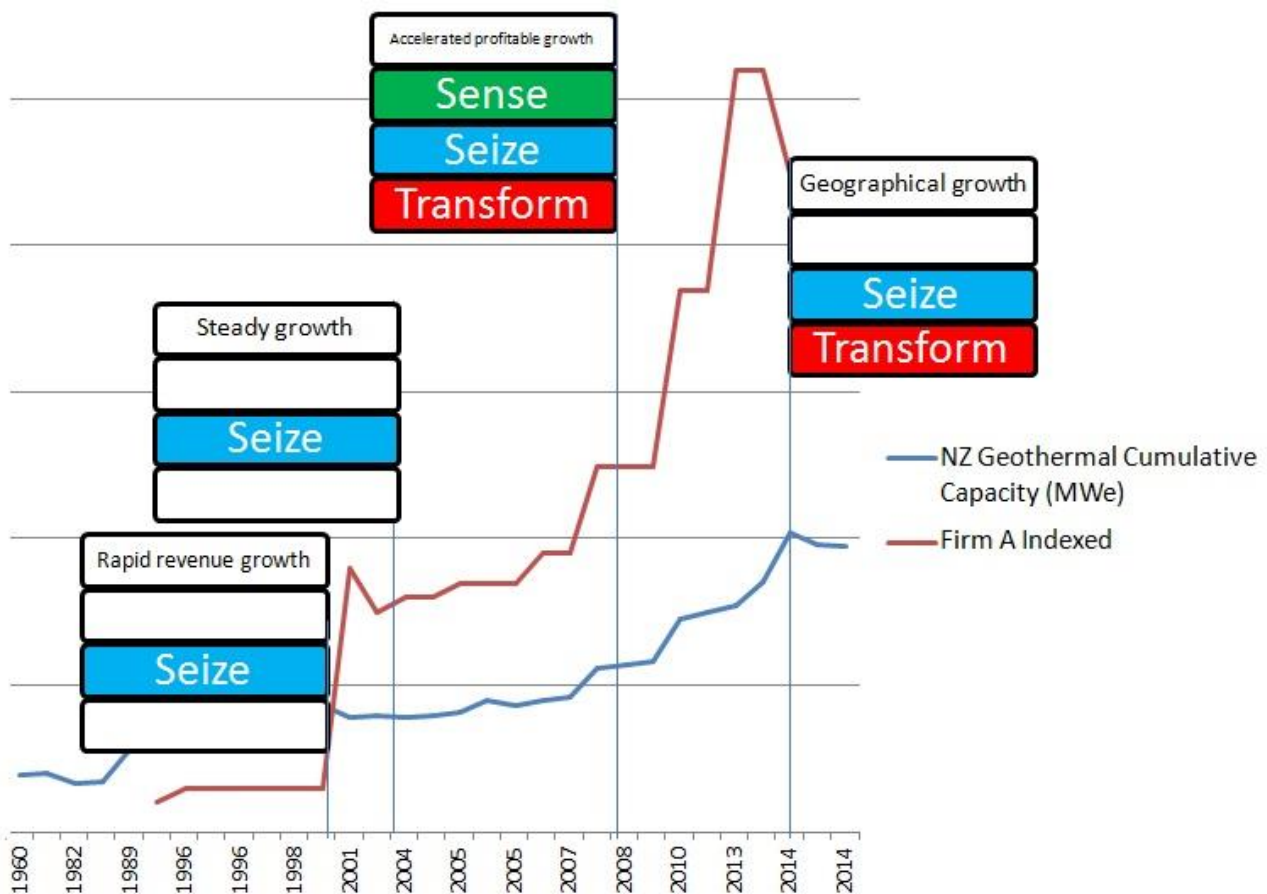
Figure 7.19 – Firm O growth trajectory, industry index and dynamic capabilities at inflection points.



7.4.3 Dynamic capabilities renewal for firms exhibiting sustainable growth.

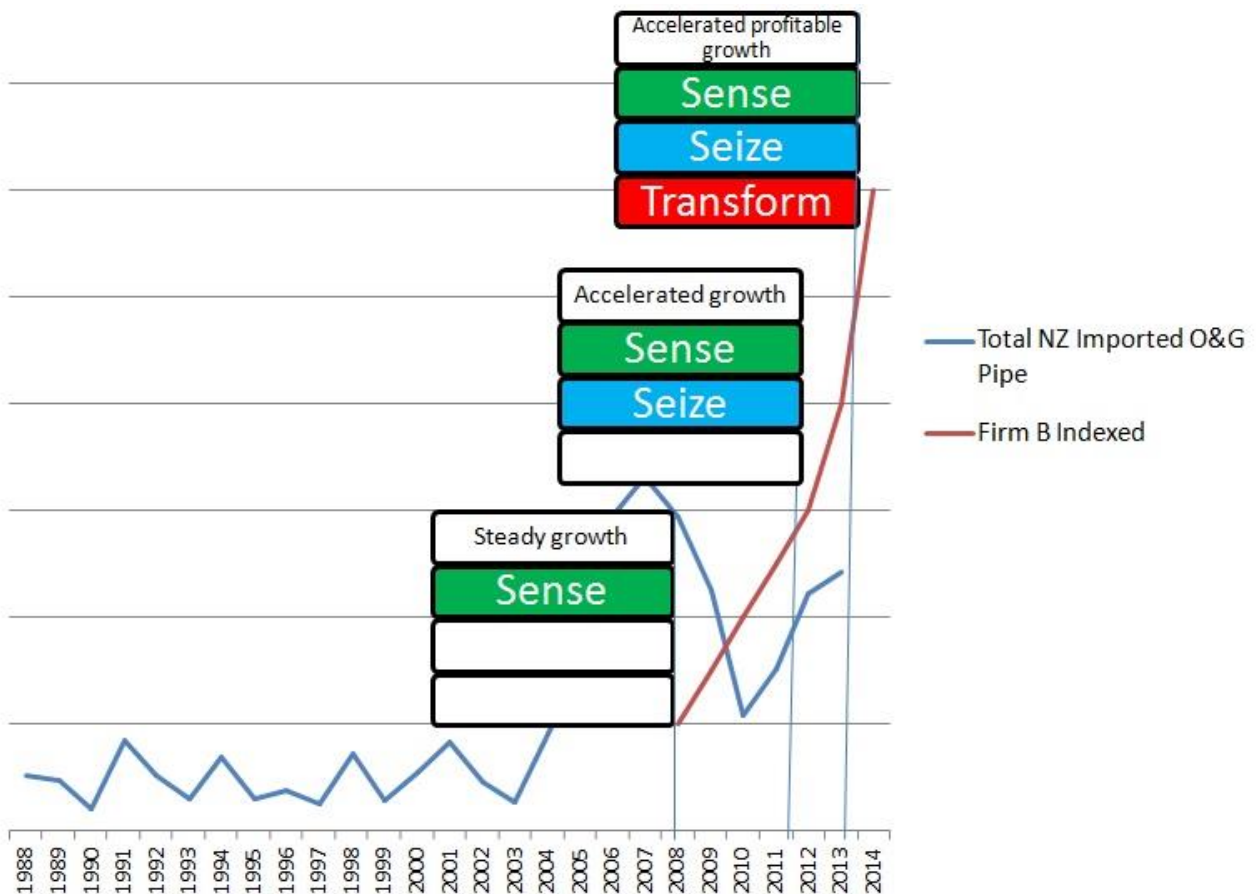
The next set of firms were all established as having exhibited sustained growth over time, either in terms of number of FTEs or revenue or where these were in decline, where profitability improved. Firm A exhibited regular changes to the business in the form of sensing, seizing and transformational dynamic capabilities. This regular change has seen it grow until recently (Figure 7.20). Initially, seizing capabilities served the firm's needs as it grew on the back of its "technical fitness", its ability to perform specialised work in a growing market which required the unique skills the firm offered. Profitable growth followed the firm's recognition of the need to maintain unique skill-sets through offering profit incentives and shareholding to key staff. The next significant phase of growth began after the firm "corporatised" its structure and employed a professional CEO. Dynamic capabilities were associated with this phase (from 2006). It was only after a decline in domestic business did the firm consider geographic growth as an option, but were able to change resources to accommodate this intentional change. Although growth in FTEs has not been associated with this latest phase, the firm has been able to establish its brand across the wider Australasian marketplace.

Figure 7.20 – Firm A growth trajectory, industry index and dynamic capabilities at inflection points.



Firm B has managed to grow consistently and at an increased pace since inception (Figure 7.21) on the back of the sensing capabilities of the entrepreneur owner despite adverse market conditions. Firm B’s ability to adjust to adverse market conditions through seizing an opportunity at short notice illustrates the flexible entrepreneurial nature of its limited resources (Zahra et al, 2006), yet it took until 2014 to transform these resources. Over the 2012 and 2014 inflection points, revenue growth accelerated in line with the managing director’s intentions to the point that he understands a change is necessary to grow further, “I think we have pretty much almost maxed out the money that we can draw out of their maintenance work at the moment”, “unless we start doing slightly different things, maybe machinery and start laying pipes or starting doing more civil type work (we are not going to grow further).” This last statement illustrates a keen sense of how the managing director intends to modify Firm B’s resources in the pursuit of growth.

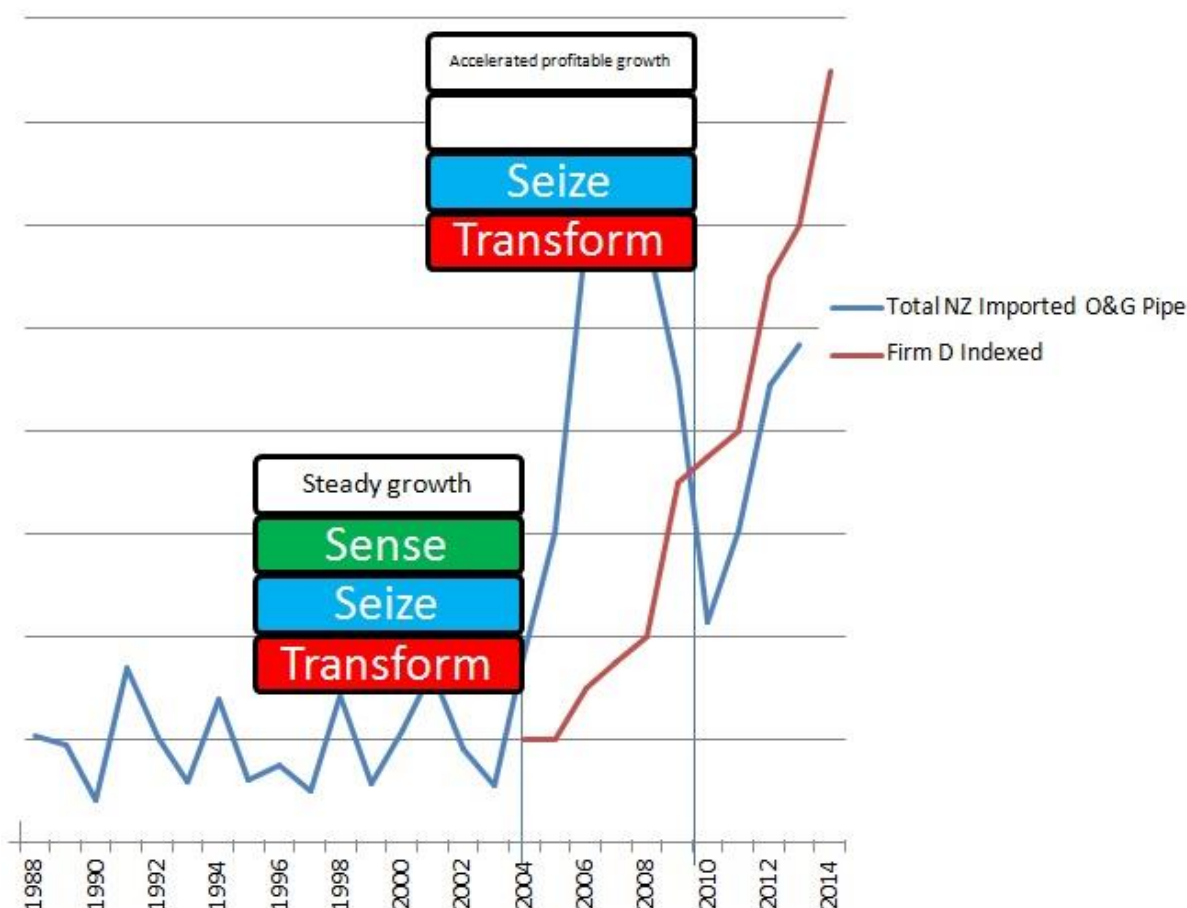
Figure 7.21 – Firm B growth trajectory, industry index and dynamic capabilities at inflection points.



Through the strength of existing business networks (Davidsson & Honig, 2003) the founder of Firm D was able to set up a business that grew steadily over time (Figure 7.22). Dynamic learning capabilities were in evidence from the start. The business grew to the point that, like Firm A, it was able to bring

in a general manager with international skills. There is a definite and deliberate transition of the business from entrepreneurial to directional (Greiner & Bhambri, 1989; Greiner, 1998 {1972}) and despite the global financial crisis, the firm grew. The dynamic capabilities identified at this point were many and transformational (Appendix D – Firm D). Firm D’s growth was largely due to the determination of the entrepreneur who recognised the need to transform firm resources and utilised opportunities to gain key skills and deliberately sought out market offerings, “the additions of new products to our portfolio in a sales sense has been very slow but very determined.” This deliberate renewal of firm dynamic capabilities has stood it in good stead as it transitioned through various phases of growth.

Figure 7.22 – Firm D growth trajectory, industry index and dynamic capabilities at inflection points.

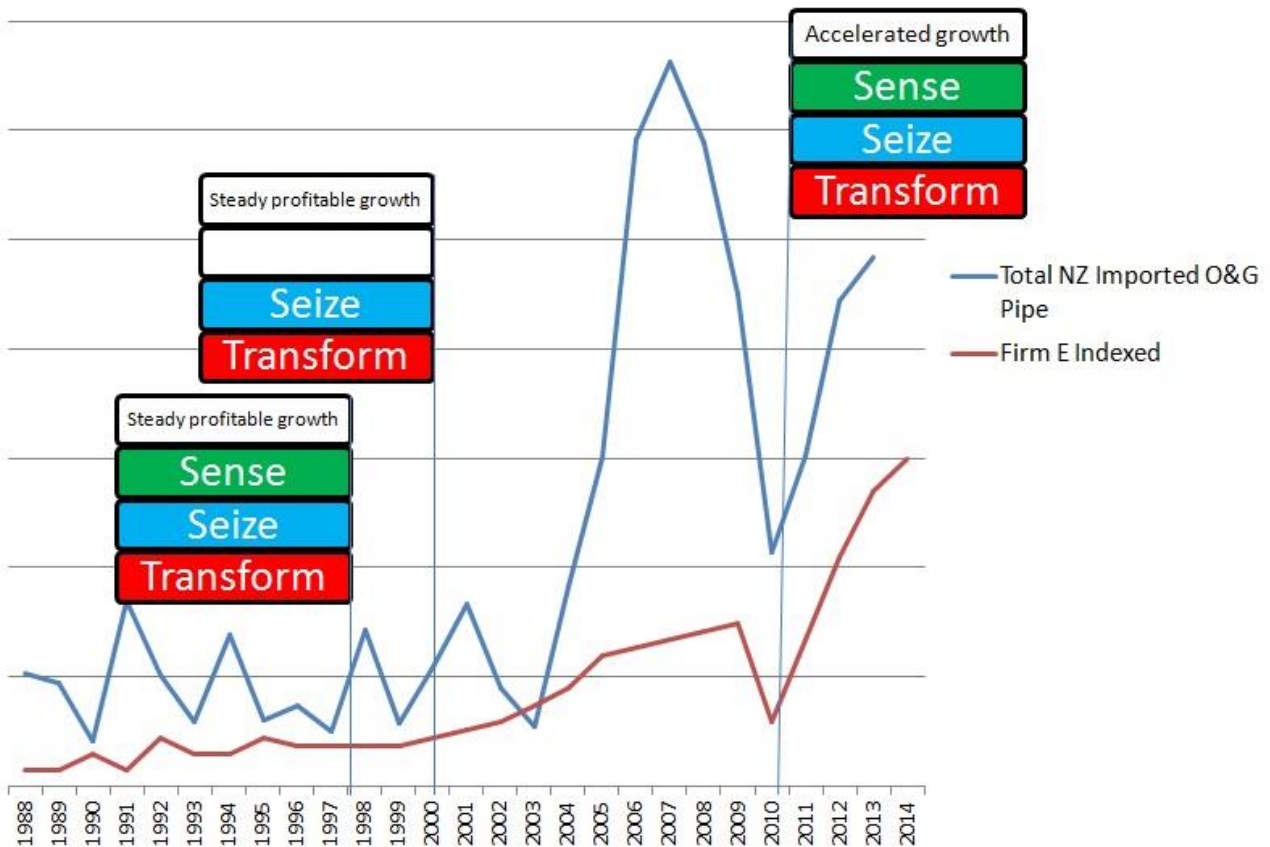


Firm E is possibly the “poster” firm for intentional dynamic capabilities renewal processes including in the face of market threats, as the inflection point in 2009-2010 (Figure 7.23) illustrates. From the outset, the managing director of Firm E has been sensing, seizing internal opportunities and transforming resources to maintain what appears to be a sustainable level of growth. In all the inflection points, dynamic capabilities renewal processes have included transforming firm resources,

such as the offering of shareholding to key staff and changing the governance structure and thus the “resource mobilisation” (Garnsey, 2002) has been consistent. Firm E’s resources have been consistently created, extended and modified. The resources have also been transformed and redeployed, indicating renewal of the firm’s unique capabilities. Finally the managing director illustrates renewal processes and their effect,

“it’s different now because it’s deliberate growth. I’ve taken steps hiring [Redacted] initially as CFO and then [Redacted] and even [Redacted], getting involved with [Redacted] has been an effort to grow this business here. That strategy is still in play. I’ve just hired [Redacted] in Melbourne, [Redacted] in Perth and [Redacted] in Singapore and we’ve got another local associate in Singapore and a partner in Indonesia. And the whole idea of all that, it equates to a lot of costs but I am anticipating that it is going to equate to a lot of growth as well.”

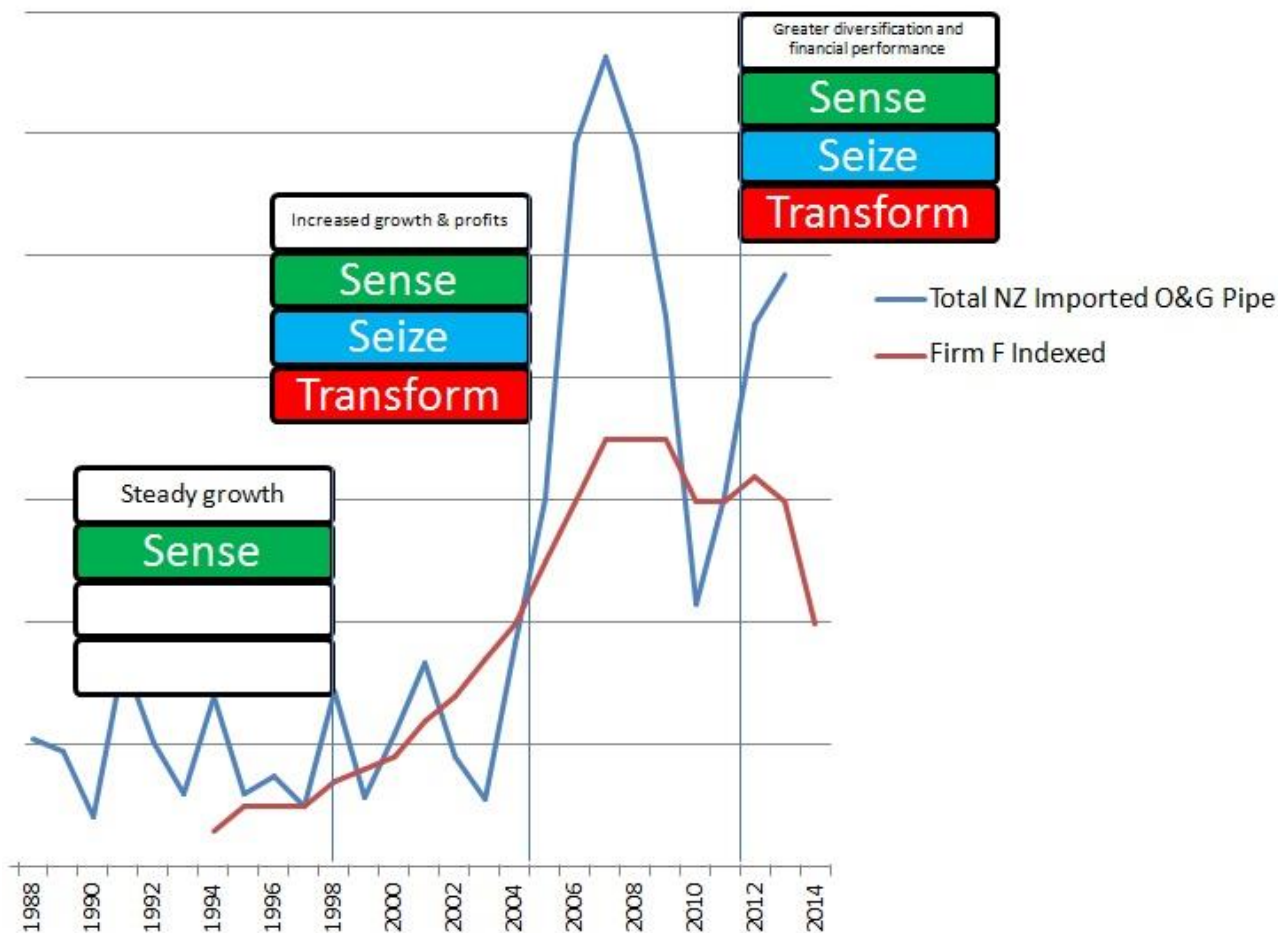
Figure 7.23 – Firm E growth trajectory, industry index and dynamic capabilities at inflection points.



Three inflection points are observed (Figure 7.24) in Firm F’s growth trajectory. These points broadly line up with corresponding market conditions. Firm F’s growth is largely captured through the ability of Firm F to sense and seize market growth opportunities. When faced with adverse market conditions, the firm is able to remain profitable through the ability to reallocate existing resources

and transform its governance structure and business model. A couple of years later when the firm encountered a crisis, it once again demonstrated an ability to sense this crisis, seize multiple internal opportunities and transform its business model, governance structure and reallocate key assets. Importantly Firm F was able to remain profitable.

Figure 7.24 – Firm F growth trajectory, industry index and dynamic capabilities at inflection points.

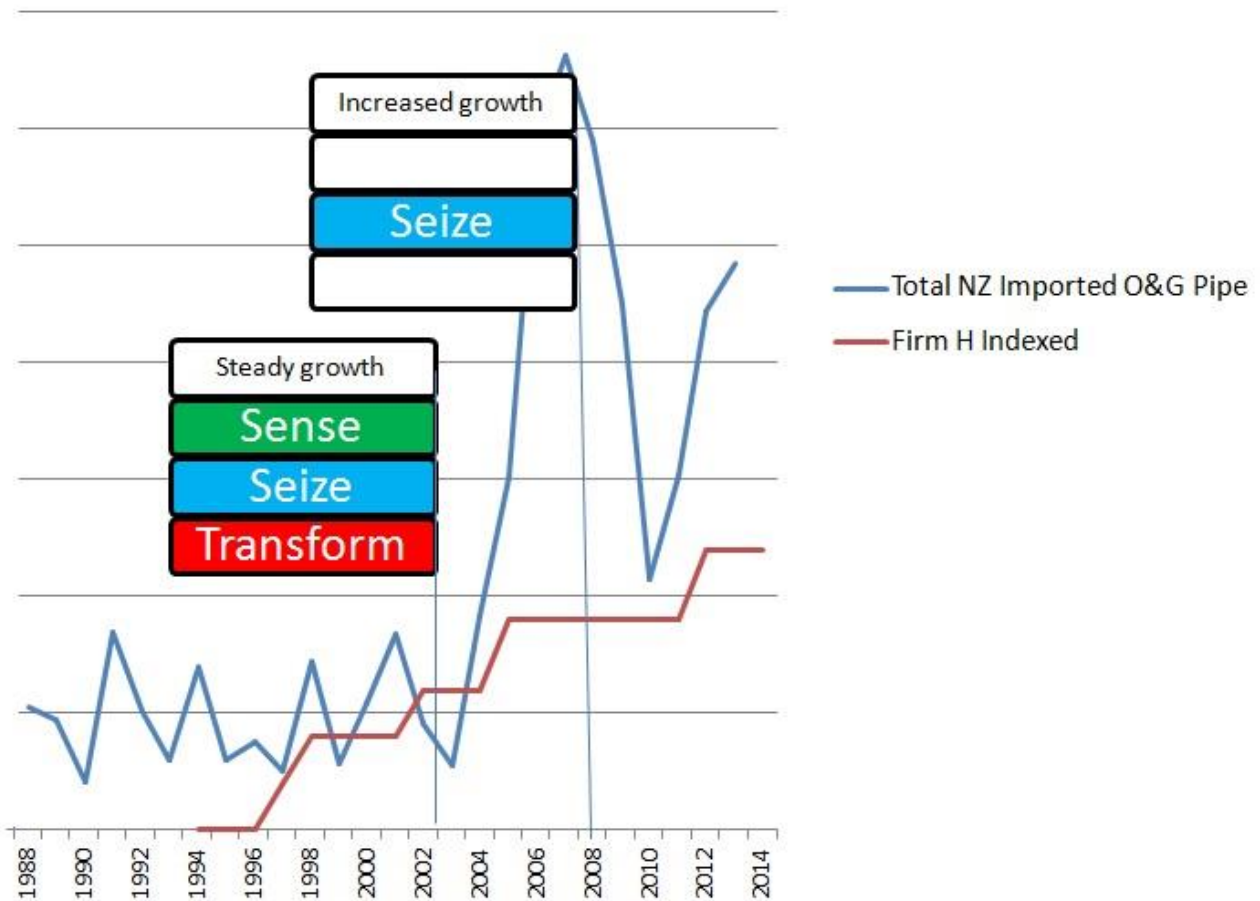


Firm H is an example of a firm with steady growth from the outset (Figure 7.25). With the leadership and creative attributes evident, coupled with clear direction, Firm H has grown steadily without any evidence of crisis. Whilst it is a small firm, the niche and complex nature of work Firm H performs renders it susceptible to the ups and downs of the industry it operates in. And yet it continues to grow steadily through clear direction as the managing director suggests,

“from about 2000 we’ve steadily increased our influence in the Auckland market. We’ve really looked at strategically what we’re trying to achieve and saying that we’re not a projects based company first and foremost. We are a maintenance and service based company and our philosophy has really been to target Taupo north and to then be able to be readily available to whatever clients need us for and deliver on service.”

It is no surprise then that evidence of dynamic capabilities exists from the inception of the firm and has not diminished since. Firm H did embark upon seizing an opportunity to spin off a firm when its core was shifting (Kay, 2002) and perceived to be a threat. This dynamic capabilities renewal kept the firm on its growth path and illustrated the effect of intentional strategic direction.

Figure 7.25 – Firm H growth trajectory, industry index and dynamic capabilities at inflection points.



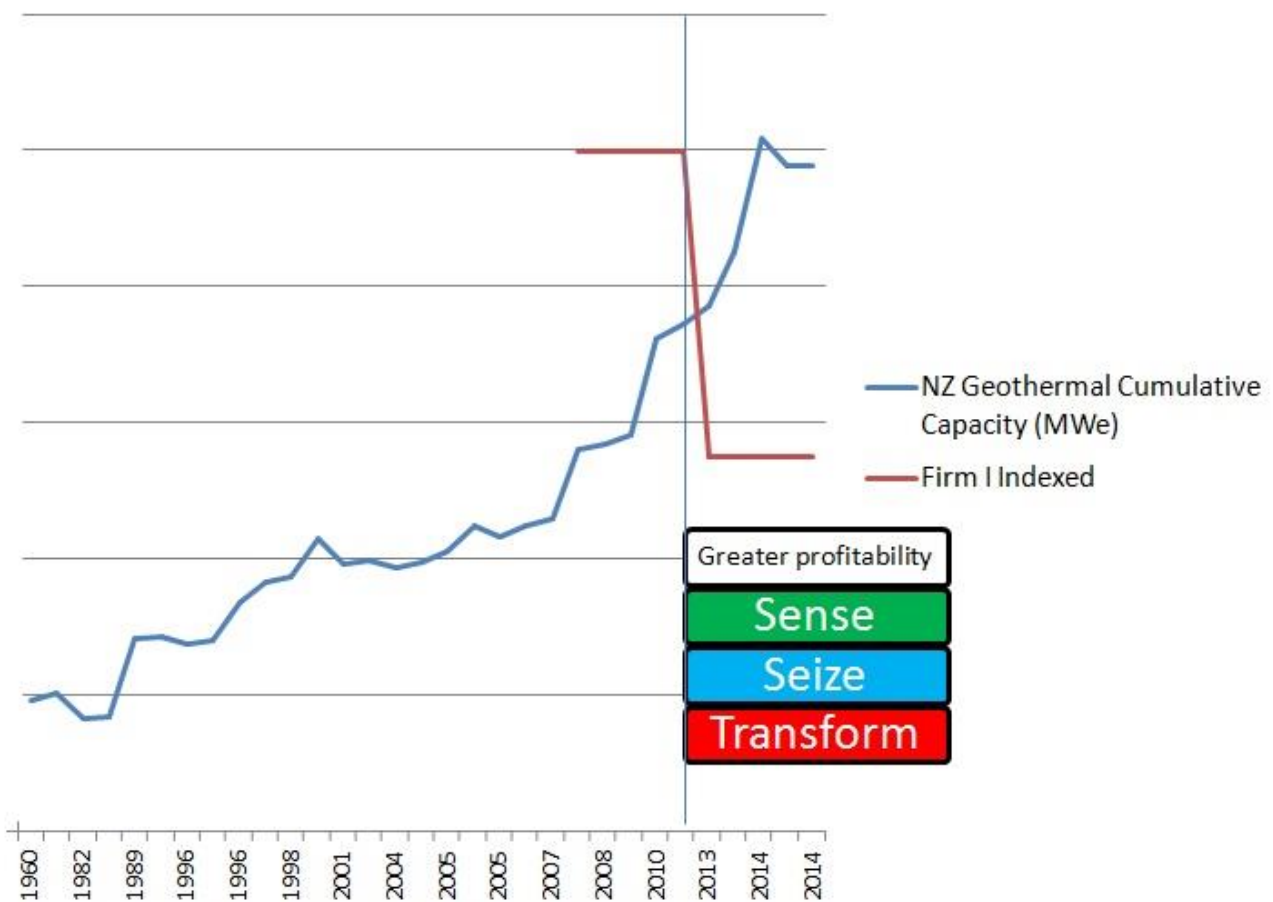
Firm I’s transition from a stagnant heavy engineering firm to one where the intervention of the new CEO (Augier & Teece, 2008; Augier & Teece, 2009) and market demand (Marris, 2002) combined to improve the profitability of the firm. Figure 7.26 illustrates the counter-intuitive growth trajectory of the improved growth prospects of Firm I after it divested itself of its Australian manufacturing plants. Once the CEO was tasked with improving the business, he sensed an opportunity to invest in production technology, workforce literacy and oversaw a change in firm governance. The CEO summarises on the changes being;

“very much a classical turnaround type story of the last four years. So to me in terms of what I know of what you’re doing, it’s a bit of a challenge because actually there’s a whole lot of growth that has

actually been about going from being in that move to close the business down, a gradual closure of the business into one of seeing a future to the business.”

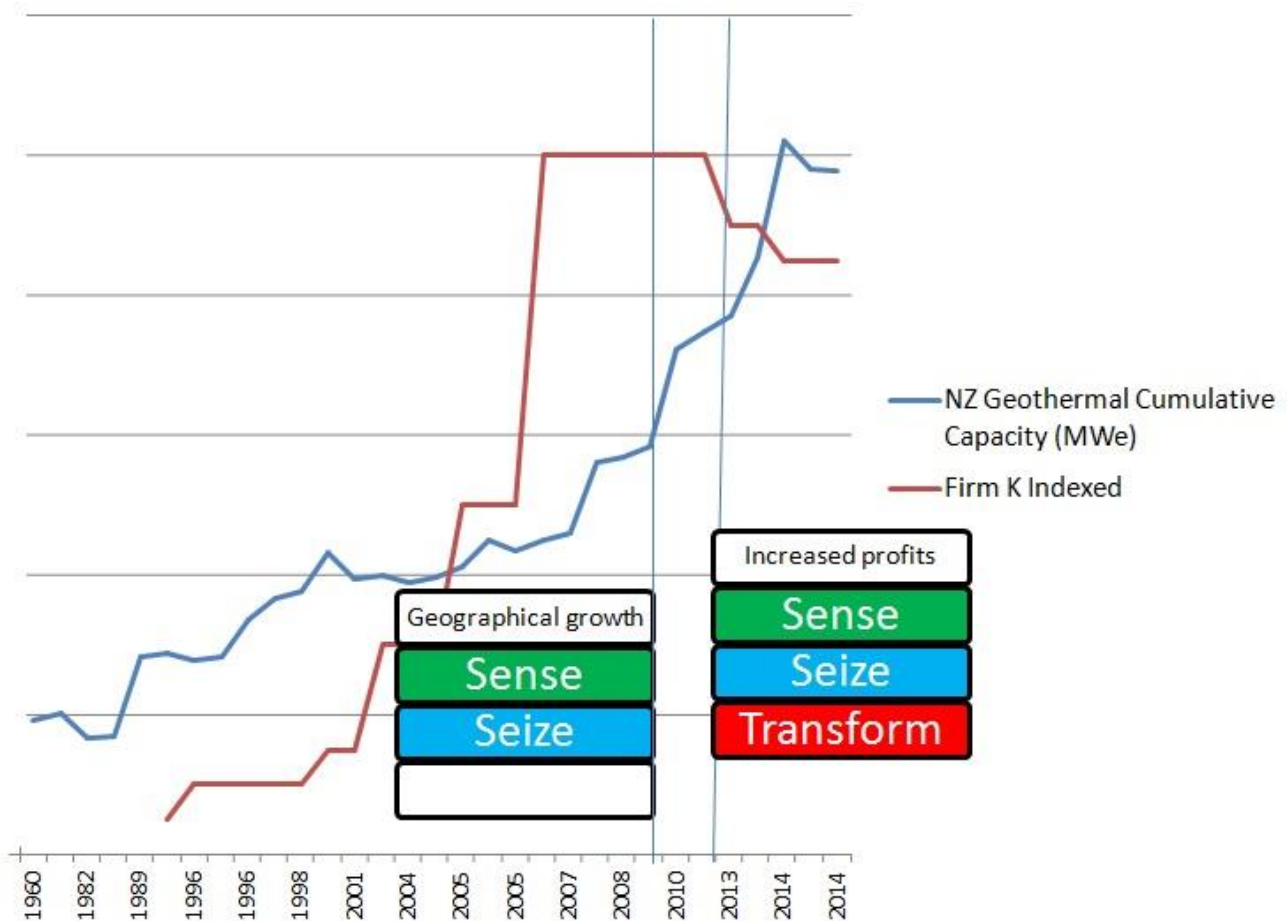
Firm I admittedly saw opportunities in the market, which the firm seized, but in so doing transformed firm resources to not only reap the benefits of these market opportunities, but to establish a culture of learning and firm improvement.

Figure 7.26 – Firm I growth trajectory, industry index and dynamic capabilities at inflection points.



As a specialised engineering firm, Firm K grew on the back of its key industry growth (Figure 7.27) through what could be described as its “technical fitness”, the ability to do its job well. Sensing and seizing capabilities were evident at the first growth inflection point that saw the firm utilise existing resources to seek and thence achieve modest geographic growth. The second inflection point however, saw the acquisition of knowledge capabilities and a major change in firm resources. This firmed up the geographic growth and resulted in greater profitability of the firm, even though its FTEs remained static. The last inflection point built on this change and some fine tuning of resources resulted as investment was made in marketing skills.

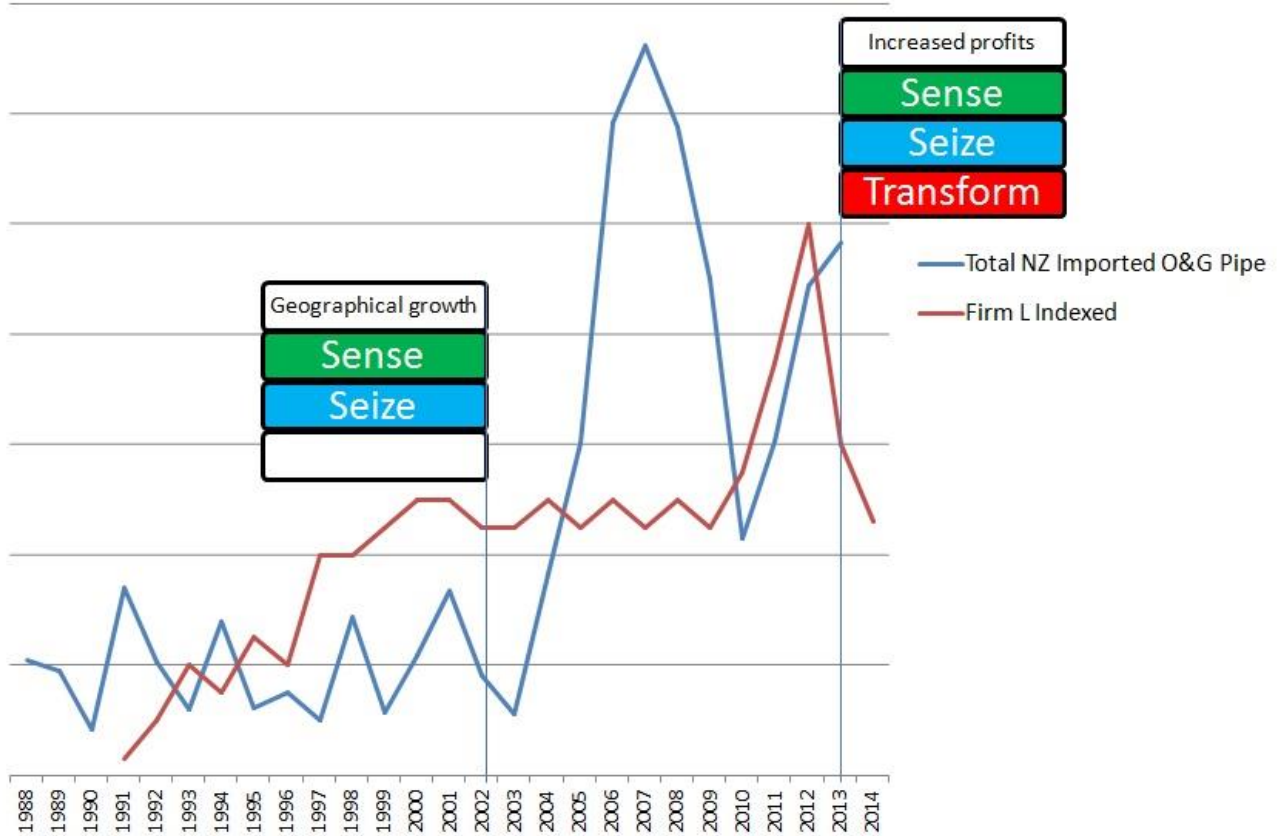
Figure 7.27 – Firm K growth trajectory, industry index and dynamic capabilities at inflection points.



Firm L exhibited an initial growth spurt from 1991 attributed to its specialist technical skills (fitness) after which growth levelled out in 2000. Up until 2006 there was no evidence of dynamic capabilities. The firm expanded offshore when it was able to sense opportunities with its current resource set. Firm L was also able to seize these opportunities to contribute to a period of impressive growth until 2012. However this growth was not sustainable and a dramatic decline from 2012 prompted the managing director to look deeply at the internal resources in his business. This inflection point is notable as opposed to the earlier one in 2006 as it includes transformational capabilities. Whilst the growth curve of Firm L (Figure 7.28) suggests that the firm is on a spiral downwards, the result of the transformation of key resources has rendered the firm’s owner more resilient as he plans a future for the business,

“so yes we’ve grown up. We’ve become a bit harder in our approach to the oil industry and it’s starting to pay dividends.”

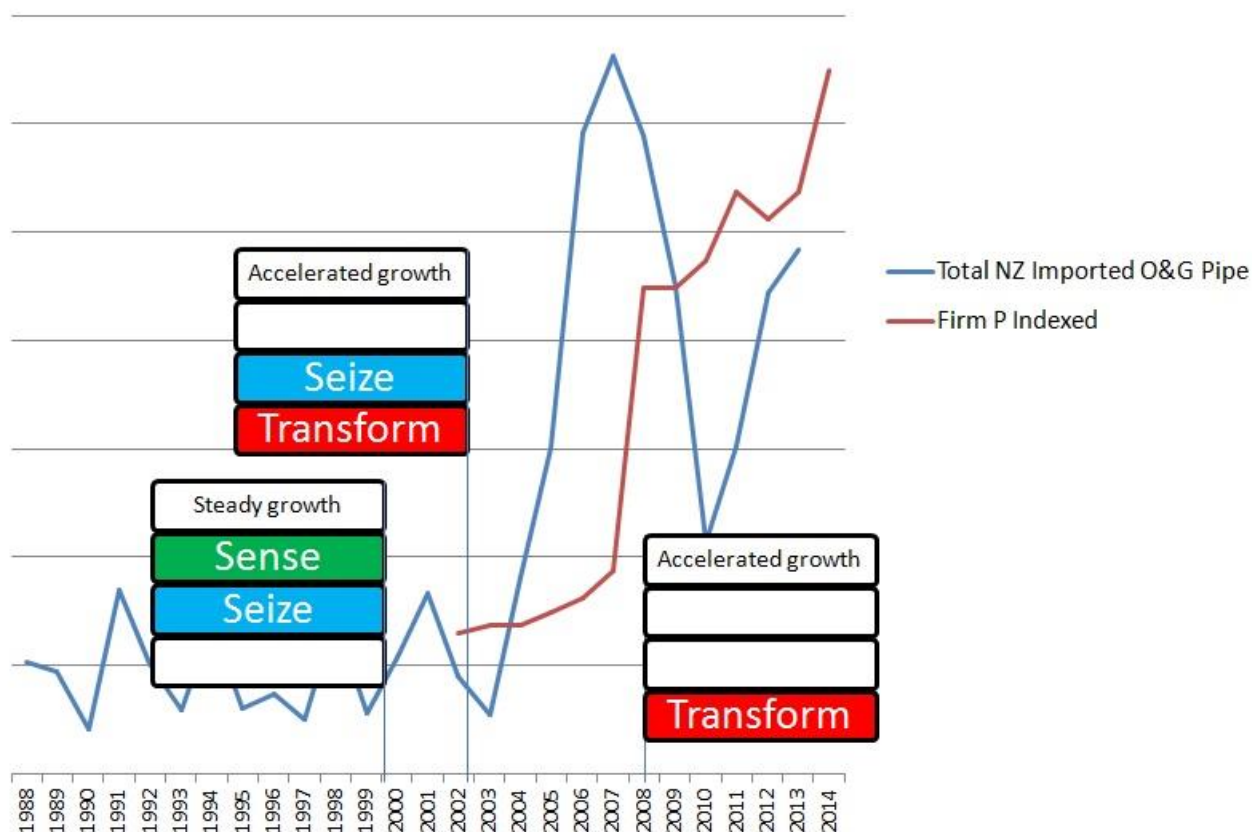
Figure 7.28 – Firm L growth trajectory, industry index and dynamic capabilities at inflection points.



The last firm exhibiting sustainable growth examined for dynamic capabilities renewal processes, Firm P illustrates intentional sensing and seizing opportunities and transforming resources. Firm P’s growth from a medium size firm to a large firm expanding geographically has been sustained through strong dynamic capabilities. At key inflection points on the firm’s recent growth curve (Figure 7.29) the firm has been able to sense and seize opportunities (both internal and external) and transform resources in the intentional pursuit of growth. Seizing capabilities and transformation of resources such as engendering loyalty through decoupling the administrative head office from operations and treating the branch managers as CEOs has seen growth opportunities realised. The managing director summarises,

“we’ve tried to make as independent as possible groups of the businesses and the businesses under their own CEOs which we expect them to come or to provide their own strategic plans, their own ambitions for the business and their own way forwards and we support that. Our focus has been really on growth. We’ve had a thing on growth. We like growth. “

Figure 7.29 – Firm P growth trajectory, industry index and dynamic capabilities at inflection points.



7.4.4 Discussion on dynamic capabilities renewal processes.

In Chapter 3.2.4 the question is posed “how does the renewal of dynamic capabilities influence firm growth?” In order to answer this question, the preponderance of dynamic capabilities was considered for firms exhibiting unsustainable and sustainable growth. Strategic renewal is itself process dependent (Agarwal & Helfat, 2009), allowing dynamic capabilities’ prerequisites to be applicable. A reaction to external influences is not sufficient as a criterion of capability renewal and further growth, as can be seen in Firm J’s case study. A firm’s renewal of processes are able to be assessed for its “strategic fit” with the firm’s capabilities. By applying the evolutionary fitness test, the firm’s renewal processes are able to be assessed for their applicability as dynamic capabilities, as in the case of Firm A which refocused the firm’s resources on geographic expansion after a domestic market downturn.

Visually, the figures above illustrate that firms exhibiting sustainable growth exhibit more dynamic capabilities than those in the unsustainable growth category. For the case study firms, this visual approach illustrates a strategic “trick” to “continually renew the (dynamic capabilities) system” (Zahra et al, 2006, p. 945). Many of the firms, including A, B, D, E, F, G, H, K, L and P took advantage

of favourable market opportunities and grew as a result. These firms exhibited an overwhelming ability to sense and seize these opportunities with their current resources when these opportunities presented themselves. Some did not succeed in maintaining this growth when the market opportunities receded. Some firms made changes which were exclusively resource transformational (Firms A, F, I, K and L) and improved firm profitability.

Firms B, D, H and P were able to sustain this growth despite the change in external market conditions. At the inflection point identified, resources were transformed. For example, Firm B was able to change the ownership structure, business model and reallocate assets to pursue a more focused growth strategy. Firm P was able to incentivise its key managers through transforming to a more autonomous business model and governance structure.

Firms D, E and H, all exhibited the ability to transform resources from the outset. Firms F and N started out with the same ability to transform resources but when more recent market changes challenged the firm's growth trajectory they were unable to sense and seize this threat. It was only after this threat impacted its growth negatively did Firm F transform its resources, in particular those relating to governance, business design and asset orchestration. Growth has not improved, but profitability has. Firm E provides an example of a firm able to grow at a greater pace after a period of decline due to adverse market conditions. It is worth noting that Firm E has exhibited the ability to renew dynamic capabilities since its inception, especially those of a transformational nature.

Firm N has done the same, yet the "strategic obsession" of the entrepreneur is diminished such that when the market changed, there is an acknowledgement that something needs to be done, as the managing director suggests Firm N,

"needs someone else running it and it needs a little bit of fresh blood in the sale team and it needs more resource in the service team."

What the renewal data show is that the relationship between dynamic capabilities and growth is a nuanced one that requires a recursive discussion (Yin, 2010).

8.1 Introduction.

This thesis is attempting to answer calls (Augier & Teece, 2009; Helfat et al, 2007; Koryak et al, 2015; Peteraf et al, 2013) to further understand the role dynamic capabilities play in firm growth. The research opportunity is created due to the gap between dynamic capabilities theory and practice. The dynamic capabilities framework is clear on what dynamic capabilities are and what they do, but not how they do it. Whilst the likes of Teece, Pisano, Helfat and Winter suggest that dynamic capabilities are necessary for sustained firm growth, unfortunately they do not offer any guidance on how to analyse and measure the effectiveness of dynamic capabilities on sustained firm growth. This gap was bridged through the operationalisation of dynamic capabilities by understanding what their processes are. Case studies were prepared in order to examine firm processes at inflection points along the firm's growth curve.

This chapter summarises evidence from Chapters 7.2, 7.3 and 7.4 from the case studies prepared within a constant context: the New Zealand energy industry. With enough case studies, patterns emerge (Eisenhardt & Graebner, 2007; King & Horrocks, 2010). As dynamic capabilities are said to "enable business enterprises to create, deploy and protect the intangible assets that support superior long-run business performance" (Teece, 2009, p. 3), the case study categories of un-sustained and sustained growth (or performance) allow comparisons in firm capabilities to be made over their long-run growth trajectories. All the research firms, bar Firm C, are SMEs providing an a priori analysis framework.

The first three research questions asking whether sensing, seizing and transforming capabilities influence firm growth are addressed by examining the case studies alongside their market threats and opportunities. In order for firms to sustain growth in an industry presenting market growth opportunities, it would appear sensing and seizing capabilities would suffice. Yet, when market opportunities turn to exogenous growth threats, firms that implement transformational capabilities, by themselves or in conjunction with sensing and seizing capabilities, either sustain their growth or sustain their growth opportunity by improving profitability. Those firms that utilised the opportunity of industry growth to implement transformational capabilities, alone or in conjunction with sensing and seizing capabilities were able to improve their resilience when the market later presented a threat to growth. Firms retaining or improving profitability whilst their industry growth is in decline are considered as exhibiting "above average performance" (Helfat et al, 2007).

One off dynamic capabilities implementation does not provide the firm with a long-run sustainable growth trajectory as Firm M's case study illustrates. Firms that have a record of implementing and then renewing dynamic capabilities processes, despite the market offering opportunities or threats, have a tendency to sustain their growth over time. The fourth research question asks how the renewal of dynamic capabilities influence firm growth. The research shows firms able to maintain growth over time demonstrate a preponderance of dynamic capabilities process implementation, either premeditated or in some cases reactionary, yet strategic and nonetheless satisfying the evolutionary fitness test requirements.

The case studies also open up some future research opportunities. It is apparent that firms, no matter how "evolutionary fit" are able to grow when there is a market demand. Yet often this growth occurs at the expense of profits and is not sustainable (without considering expansion with merger). Profitable growth and the role of dynamic capabilities are discussed later. It cannot be ignored that the motivation (intent) to implement dynamic capabilities is directly linked to the strategic intent of the entrepreneur or manager. There is also evidence that from start-up firms such as Firms B, D and H to established and sizable ones, Firms G, O and P for example, offer an opportunity to examine the role dynamic capabilities play in the phases of firm growth. For example, observations include those in which firms in the creative phase of growth rely overwhelmingly on sensing and seizing capabilities.

8.2 Sensing capabilities and firm growth.

A firm's resources deliver for the firm an (internal) opportunity of creating a strategically competitive advantage. Yet they also present to the firm a potential threat. When a firm's resources are utilised to the extent that the firm is able to be profitable it is considered to be on a path of sustained growth. But when profitable conditions change, the firm must be prepared to review its resources in order to maintain its profitable trajectory. The preparedness to change relies on the firm's ability to sense these opportunities and threats. Sensing is heavily dependent on organisational learning processes (Teece et al, 1997; Teece, 2009; Zollo & Winter, 2002). Utilising the Teece micro foundations for sensing capabilities, three distinct sensing processes were identified namely; strategic firm R&D, externally acquired R&D and market related R&D.

These micro foundations required further development in order to understand what organisational learning would look like in firms intentionally implementing or enhancing these processes at an inflection point along their growth curve. The firm's growth curve was mapped alongside the firm's major industry index. Information from interviews and in many cases information provided by the firms revealed the firm's profitability at particular stages of the firm's growth curve.

Firms B, D, E, F, H, L, N and O, at the early stages of their existence, exhibited deliberately implemented sensing capabilities (Figure 8.1). These firms sustained their growth for a period of time thereafter. All the firms that then grew (or improved profitability) on the back of market opportunities exhibited sensing capabilities at the beginning or during this market led growth (Figure 8.2). These included Firms A, B, D, E, F, G, H, I, J, K, L, N and P. The evidence of sensing capabilities being implemented when the market presented a growth threat is not as clear. It could be concluded from evidence of firms that maintained or improved their growth (or profitability) despite the market threat, that their sensing capabilities were still relevant in this new market situation. There are some firms like Firms E, F, K and L that did implement new sensing capabilities after their growth declined in the face of market threats, yet the firm turned this around and improved either their growth or profitability.

Figure 8.1 – Sensing capabilities and firm size.

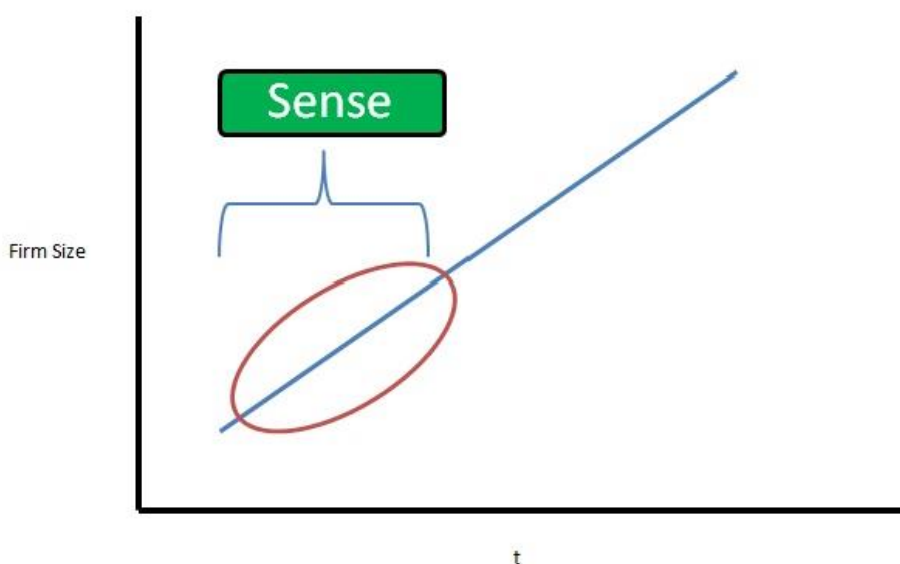
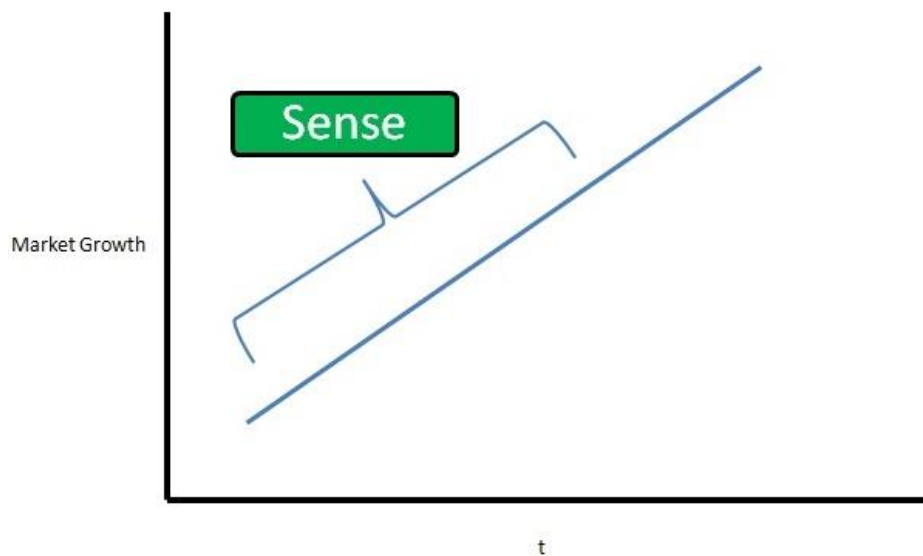


Figure 8.2 – Sensing capabilities and market growth opportunities.



Sensing capabilities are important for a firm's ability to learn about its place in its market. This knowledge presents the firm with an opportunity to understand external opportunities and threats, its own resources and assets and how they enable the firm to continue its growth trajectory. Knowing what to do and actually doing it correctly are two different capabilities, the next of which is the ability to seize the opportunity presented to the firm.

8.3 Seizing capabilities and firm growth.

It was noted that several of the case study firms (Firms A, D, E, G, H, N, O and P) exhibited seizing capabilities without any pre-cursive sensing capability. This is at odds with what the Teeceian relationship infers, where seizing capabilities depend on sensing capabilities to be evident. It must be noted that Teece does point to the managerial resource as to why this might be the case, as the "manager's ability to override certain 'dysfunctional' features of established decision rules" (Teece, 2009, p. 19). This suggests that there is a tier of capability not accounted for in the sensing capabilities' framework: that of the role of the entrepreneur, discussed below.

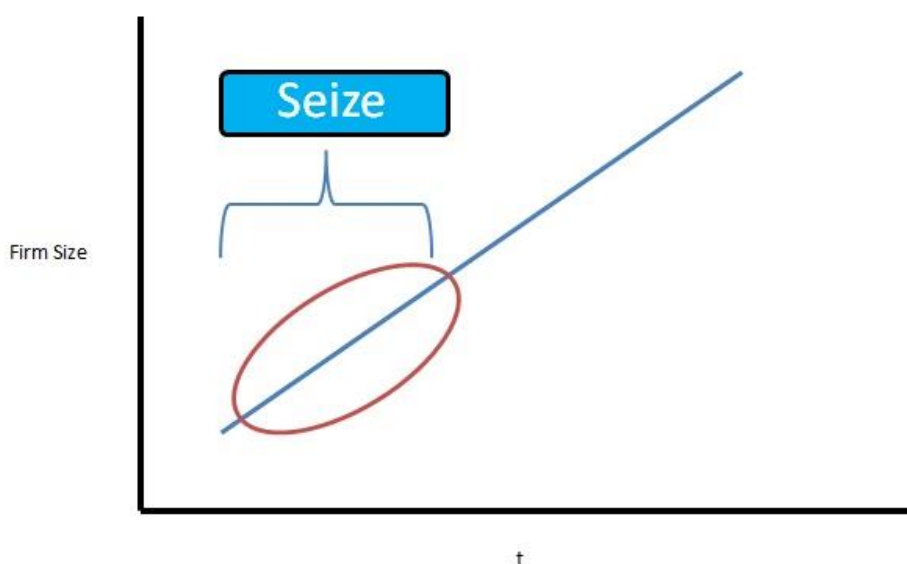
Another reason for this observation is that the seizing capabilities implemented without the precursor sensing capabilities could be the renewal of existing seizing capabilities. This is also discussed below.

Nonetheless, the evidence of seizing capabilities is associated with four dynamic capabilities micro-foundations. These are: selecting the most appropriate business model; selecting decision making protocols to capture and protect value; selecting firm boundaries and managing complements and business platforms; and lastly building loyalty and commitment in the firm. In firms exhibiting

unsustainable growth, Firms G, J, possibly M (1960s), N and O, these processes were observed at firm growth inflection points associated with market growth opportunities. Thereafter the firms grew for a period of time, yet this was not sustained.

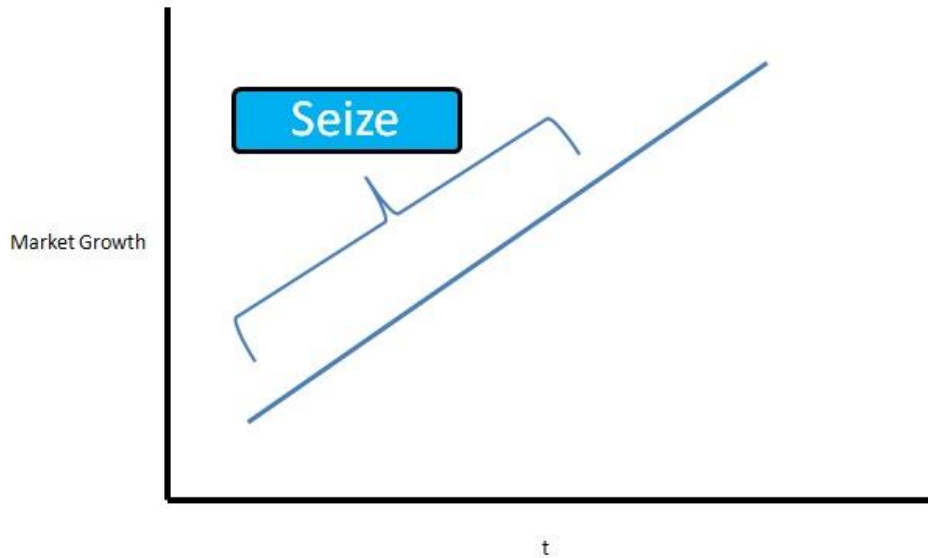
The relationship observed with sensing capabilities and firm size is similar for seizing capabilities. When Firms A, B, D, E, F, G, H, L, M and P were at an early growth stage, seizing capabilities were evident (Figure 8.3). These firms all grew from that point on, however, this observation does not mean that seizing capabilities were not evident at later stages in the firm's growth. Seizing capabilities were also observed as not having been preceded by evidence of sensing capabilities in the case of Firms A, D, E, H and P.

Figure 8.3 – Seizing capabilities and firm size.



It is no surprise then that firms exhibiting sustained growth over time also implemented seizing capabilities at points along their growth trajectories where the market presented opportunities. Firms A, B, D, E, F, H, I, K, L and P all exhibited seizing capabilities at several inflection points along their growth trajectories. These inflection points are not exclusively observed as being evident at a particular stage in a firm's growth. It is however apparent in both the un-sustained and sustained growth firm categories that seizing capabilities are associated with growth where market led growth is observed (Figure 8.4 illustrates this relationship). Growth (or profitability) following this implementation in all the cases improved. The only exception to this is Firm O, where the growth resulting from the intentional change in business model was geographic. The next period saw firm size and profitability decline.

Figure 8.4 – Seizing capabilities and market growth opportunities.



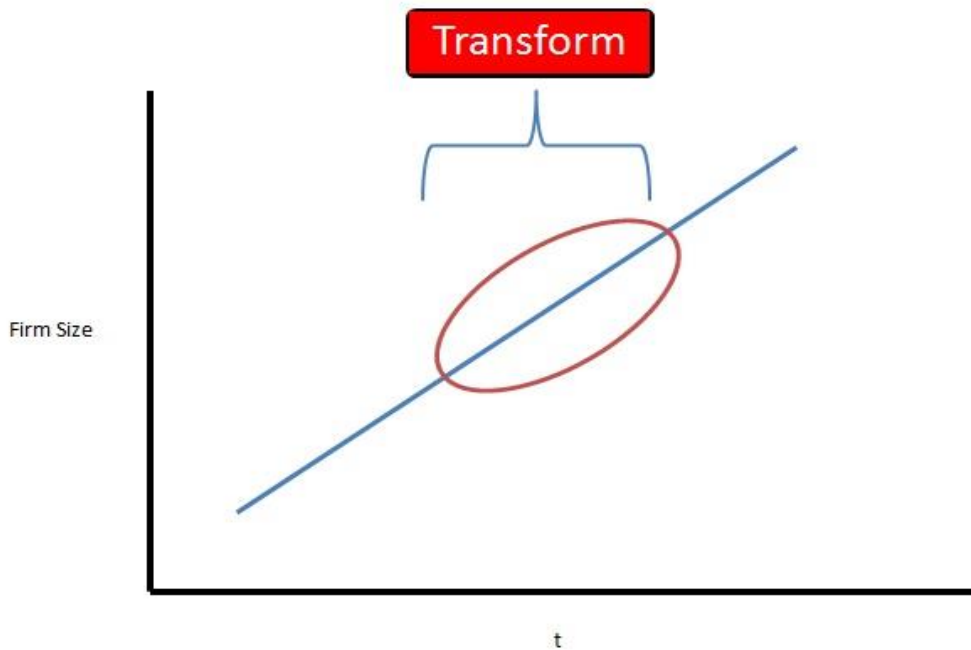
The choice of strategies available to a firm in order to compete in a marketplace with existing resources rests on its ability to seize both internal and external opportunities. The processes associated with seizing capabilities relate to how the firm strengthens its mechanisms for capturing value from its market opportunities and shores up its weaknesses when the market presents a threat. Interestingly, only Firms G, H, L and P exhibited seizing capabilities during market downturns. These downturns did not last long however. Despite this, Firm G did not continue to grow sustainably (Firm G no longer exists) and yet other firms did. The research questions are designed to extract from the cases what is different between the firms able to grow sustainably and those that have thus far been unable to grow sustainably. Recognising that a firm's existing resources are either relevant or not in a marketplace is an important step in sustaining growth. Also required is the ability of the firm to extend these resources to seize opportunities and mitigate threats. These are not the only abilities which may contribute to sustained growth, in fact as will be seen, when growth conditions are diminishing, the firm needs to modify or transform its resources in order to sustain a profitable trajectory.

A firm's resources, appropriately managed, derive for the firm its relative performance in its market. These resources can become an internal barrier to growth as they lose their relevance in a changed marketplace. This was seen in Firm K's case study when in a market of reducing opportunities, specialised engineering skills alone was not going to offer the firm an opportunity for sustained growth. Firm K reconfigured its key resources to establish a global presence in its specialised field. The firm's ability to reconfigure these resources to better align them with the marketplace requires resource transformational processes.

Transformational capability processes include how a firm intentionally configures its key resources to fit the needs of the market by: decentralising and achieving a near decomposability of related functions; governance; managing co-specialisation of firm assets; and knowledge management. Firms in the unsustainable growth category exhibited either no or solely early growth stage transformational capabilities. There was no evidence that Firms G, J and M implemented transformational capabilities at any stage of their growth. Firms N and O did at earlier stages after which they grew, but this growth was not sustained through the next market decline.

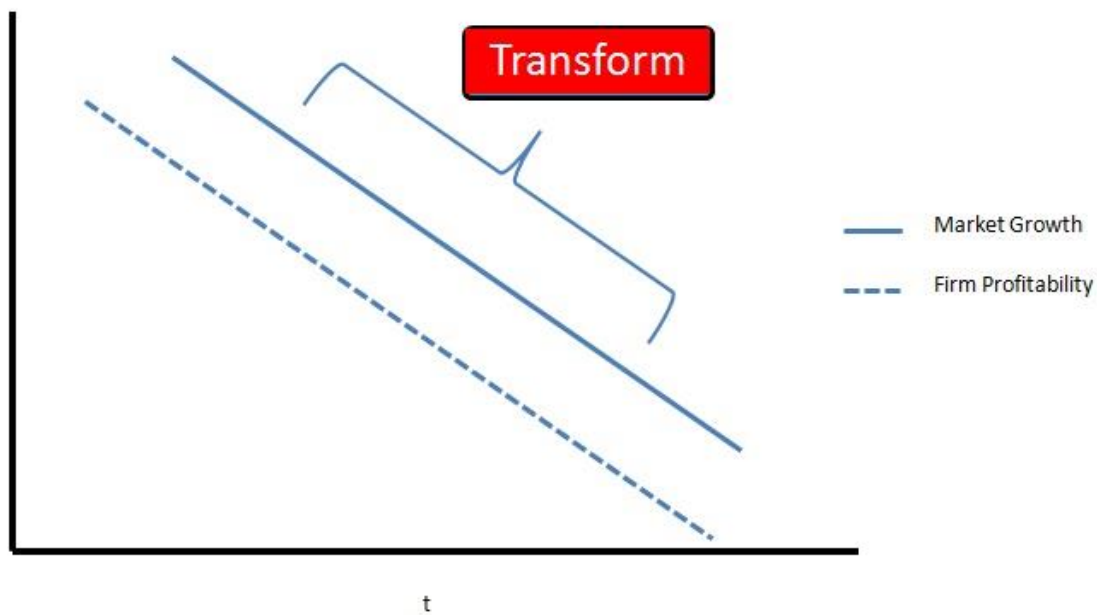
Firms A, B, F, H, I, K, L and P, which sustained growth over time only implemented transformational processes later on in their growth. Figure 8.5 illustrates this relationship. Whilst there is evidence that Firms N, O, D and E implemented transformational capabilities at early stages of their existence, that two of them sustained growth over time and two did not does not warrant an observation.

Figure 8.5 – Transformational capabilities and firm size.



On the other hand, firms in the sustainable growth category exhibited a greater preponderance for transformational capabilities. A difference is noticed between the exclusive implementation between sensing and seizing capabilities, and transformational capabilities. Whilst there is evidence that transformational capabilities were implemented when market opportunities were present, they were also evident when market opportunities declined. This is evident in firms that sustained their growth or improved their profitability, namely Firms A, B, D, E, H, K and P. Whilst Firm O exhibited the implementation of transformational capabilities during a market decline (2001) and grew for a period thereafter, when the next market decline occurred, growth stalled and profitability declined. No transformational capabilities were implemented at this stage (2011). For a firm that sustains growth over time, the relationship between transformational capabilities and the decline in market opportunities is illustrated in Figure 8.6.

Figure 8.6 – Transformational capabilities, market opportunities and unprofitable firm growth.

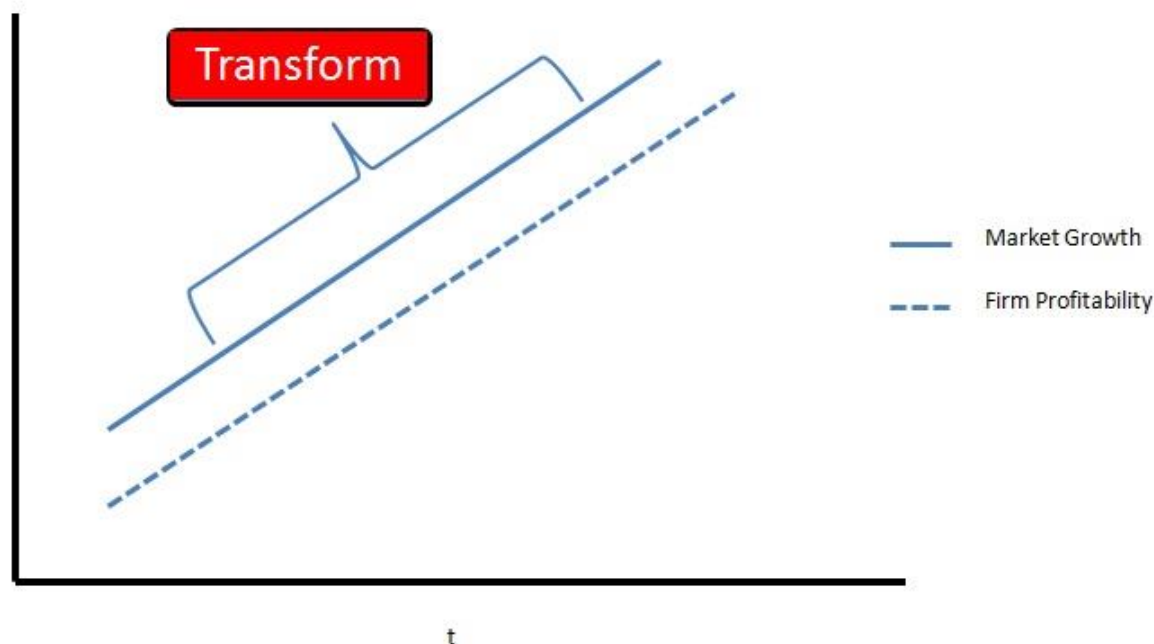


Where an improvement in profitability is evident, it could be argued that the firm is better able to take advantage of any opportunities it comes across. Such an example is Firm I, described in Chapter 7.1. Despite a long period of no growth followed by a reduction in size ascribed to a strategic divestment, the firm achieved a profitable outcome. By divesting, the firm freed up resources to take advantage of a productive opportunity, that of investing in technology and training, which ultimately improved manufacturing efficiencies, and firm profitability.

Where profitable market opportunities existed, the majority of firms implemented dynamic capabilities. Yet this was not a guarantee for sustained growth. Taking a closer look, firms that implemented sensing and seizing capabilities during these favourable growth conditions such as Firm A, B, F, G, J, K, L, M and P found they were able to grow for a limited time, after which they either renewed their dynamic capabilities or implemented transformational capabilities. Firms that failed to implement transformational capabilities during periods of market growth did not sustain growth. The suggestion is that firms that implemented or renewed transformational capabilities during periods of market opportunities managed to sustain their growth or were able to improve their profitability. The inference is that these firms used the opportunity to transform their resources whilst growth was sustained rather than react to a firm decline. Firm A for example transformed its governance and business model during a period of profitable growth. Yet Firm G only implemented sensing and seizing capabilities during a period of profitable growth. This was enough to capture the market growth opportunity but did not prepare it to sustain this growth when its market declined.

The relationship between transformational capabilities and market growth in order for a firm to sustain growth over time is illustrated in Figure 8.7.

Figure 8.7 – Transformational capabilities, market opportunities and profitable firm growth.



8.5 Dynamic capabilities' renewal and firm growth.

Strategic renewal is required as a market assumes greater heterogeneity resulting in a firm's dynamic capabilities to mature and diminish in effectiveness at maintaining a competitive advantage. Strategic renewal of a firm requires the re-organisation of critical resources through refreshment and replacement processes (Agarwal & Helfat, 2009). Importantly these processes need to be strategic to be evolutionary fit. As dynamic capabilities create, extend and modify firm resources, they are themselves required to be extended and modified (or made redundant) in order for the firm to overcome the inevitable capabilities lifecycle (Helfat & Peteraf, 2003) effect. In the non-linear growth curves in the case studies, many of the firms reacted to particular events by creating, extending or modifying firm processes. It is at the "selection event" of the "internal firm reaction" (Helfat & Peteraf, 2003) or inflection point that the renewal process is observed. In Firms G, J and M, one off implementation of dynamic capabilities processes would appear to be not enough to sustain growth. In the case of Firm M, implementation of sensing and seizing capabilities related to technology allowed the firm to take advantage of growth in the energy industry in New Zealand. Yet when the market demanded a more competitive and service oriented offering, the firm was unable to update these dynamic capabilities processes, signalling their diminishing relevance in their current form. In

the case of Firms N and O, dynamic capabilities are renewed multiple times, but not at recent market declines. Both these firms have lost the strategic intent to grow, a dynamic capabilities prerequisite. Firms that do aspire to grow and have sustained their growth illustrate a regular implementation of dynamic capabilities. Regular implementation or renewal of dynamic capabilities occurs whether or not market conditions offer opportunities for growth. Firms that implemented dynamic capabilities more than once even though market opportunities offered them a profitable opportunity for growth include Firms A, B, D, E, F, H, K, L, P and even Firms N and O at earlier stages; possibly suggesting that the process of “incremental strategic renewal” (Agarwal & Helfat, 2009) has a role to play in sustained growth.

The difference between the firms implementing dynamic capabilities at multiple stages of growth irrespective of market opportunities, and those firms that did not, is sustained growth. Some firms did indeed decline at stages, yet were able to implement dynamic capabilities and regained their growth trajectories, often when market conditions were favourable. Such firms include Firms, E, F, L and P.

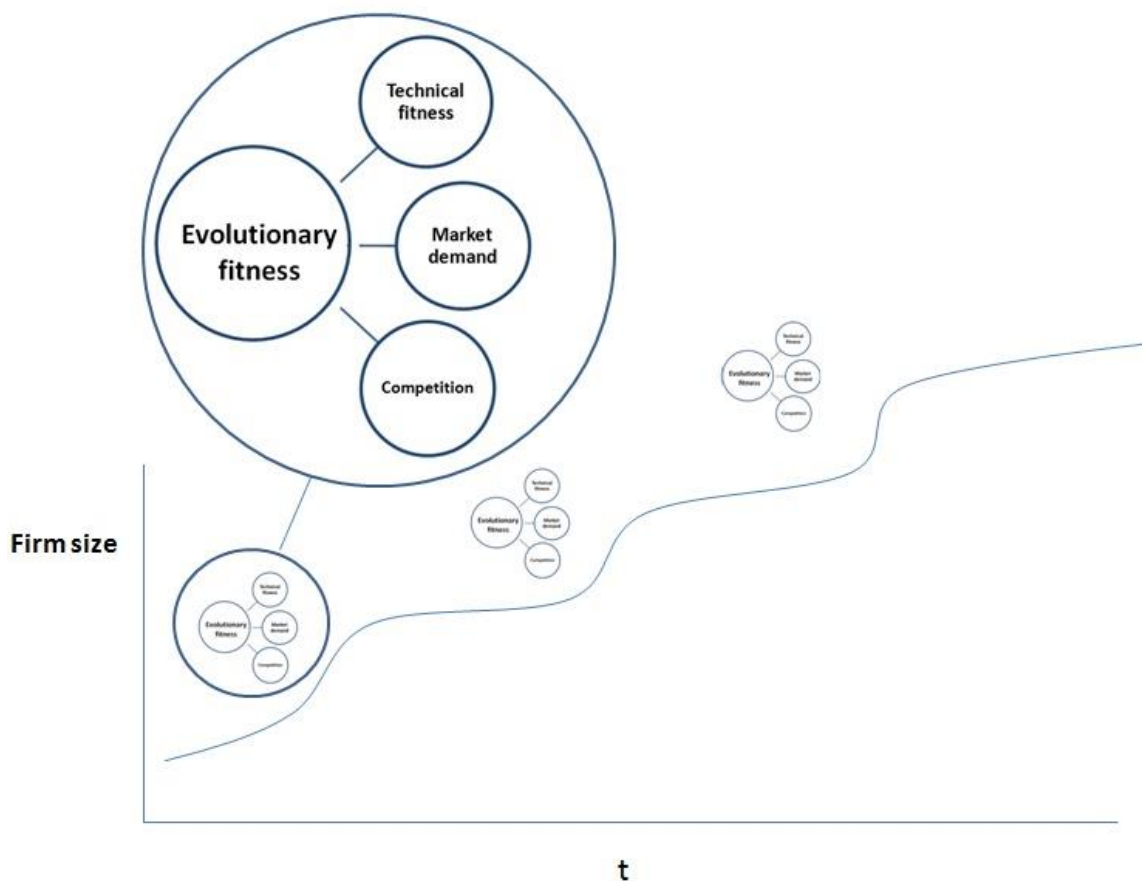
What the above argument points out is that dynamic capabilities have a varied applicability (or lifespan) dependent on the firm specifics, strategic intent, market opportunities and market threats. Renewal of dynamic capabilities in Firm L’s case involved developing the firm’s business model to change from capturing value from a geographically diverse operation to one that captures value from vertical production processes. Firm K’s changes from an engineering firm, successful initially due to specialist engineering skills, to one where paradoxically (Helfat & Peteraf, 2003) the specialist skills no longer provided the firm with sustained profitable growth. It was only when these resources were combined with specialist global marketing skills and the development of networks that the firm was able to return to a profitable situation. It must be noted, that this renewal of specialist skills (the firm’s unique resources) took a couple of years to fulfil.

The evidence from the case studies does not point to any prescribed frequency of dynamic capabilities renewal for sustained firm growth, suffice to say that those firms that implemented dynamic capabilities during times of profitable growth sustained their growth. Of the worst performing firms over time, Firms G, J and M, illustrate that renewing dynamic capabilities is necessary for sustained growth. Firms A, B, D, E, F, H, P, even N and O all implemented, then renewed dynamic capabilities more than once along their growth trajectories when market opportunities were present. Firms N and O grew during this period, yet as mentioned above, the firm’s strategic intent to grow diminished at the next stage of market threat, possibly providing an internal barrier to implement or renew further dynamic capabilities and hence grow. Therefore, in

order for a firm to strategically renew itself to sustain growth, it needs to renew its dynamic capabilities preferably when market opportunities are present. This suggests that a firm must be wary of complacency when the firm grows alongside market growth opportunities.

For a firm with strategic intent, to ward off this complacency it is suggested that a dynamic capability applicability test or “health check” is applied when the firm is in its profitable growth phase. This test could be as simple as identifying the firm’s dynamic capabilities processes and applying the evolutionary fitness test. In Chapter 3, Figure 3.6 illustrates the capability lifecycle. This is modified in Figure 8.8 to add an evolutionary test (Figure 3.13) of a firm’s sensing, seizing and transformational processes at phases of (profitable) growth.

Figure 8.8 – Dynamic capabilities’ renewal at phases of firm growth.



8.6 Dynamic capabilities and profitable growth.

From Chapter 7.2 and 7.3 (illustrated in 7.4 and summarised in Appendix D) it is possible to see that patterns of dynamic capabilities are evident at inflection points on a firm’s growth curve. The observations from these previous discussions on firms which exhibit unsustainable and sustainable growth would suggest that firms that sense a positive market opportunity and are able to seize it

will capture this opportunity to grow. All of the cases at some stage in their existence have illustrated this; many more than once. However, the ability to sense and seize opportunities does not necessarily result in profitable growth. Firm A for example enjoyed three years of fast growth, when it undertook a merger of several consulting firms. It was only when its resource base was changed (transformed) that the business grew profitably.

It has been identified that a firm's inimitability of key processes and routines is necessary for offering it a competitive advantage (Augier & Teece, 2007; Dyer & Nobeoka, 2000; Teece, 2007). But what happens as these inimitabilities become insufficient to sustain the competitive advantage the firm has enjoyed? Firm heterogeneity is diminished often due to changing market conditions, such as that that Firm E (and many others) experienced. The deliberate endogenous recognition that the marketplace is changing and subsequent renewing of routines or processes relating to the five key management skills to reposition the firm provides evidence that the firm exhibits sensing and seizing capabilities. This does not necessarily mean that the firm is then able to establish a path of sustainable performance as the case of Firm J illustrates. In fact as Firm J's revenue grew, its profitability diminished. This would suggest that sensing and seizing capabilities are useful in order to take advantage of market demand (as the Figures 8.2 and 8.4 illustrate). Yet they are no guarantee for sustaining profitable growth.

Firm I divested (and declined in size) and refocused on its key market, leading to a more profitable outcome. Divestment is a key mechanism of growth (Kay, 2002; Penrose, 1960; Penrose, 2009 (1959)) as long as it frees up the firm to take advantage of a productive opportunity. In this case, Firm I intentionally embarked on a review, restructure and reconfiguration of its firm.

In the various firms' growth curves it is evident that some grow, then show evidence of dynamic capabilities and maintain a positive growth path. At some later point in their growth trajectory, they decline as Chapter 7.2 (firms that exhibit unsustainable growth) illustrates. This does not mean that they are failing or unable to return to a path of sustainable growth. Firm E would be such an example where in 2009 -2010 it could be suggested that it was on a path of unsustainable growth. The difference between the firms that exhibit sustainable growth and those that don't would appear to be their ability to transform their key resources at important inflections in their growth curve. Consistent with growth as a response to an external threat (Kay, 2002; Penrose, 2009 (1959)), firms such as E and P grew profitably after the implementation of transformational capabilities.

The relationship between dynamic capabilities and profitability therefore is observed as being one where the profitability of the firm determines the long run growth opportunity for the firm.

Alongside the observations of growth, profitability is non-linear (Garnsey et al, 2006), yet when it improved or is sustained during market declines, firms grew in the long run. Where the firm is growing profitably in a declining market, such as Firms B, D, H, K, L, P, and until the last market decline, Firms N and O, growth was sustained. This implies that these firms were able to secure a competitive advantage in a declining market. Whether or not a firm has explicit dynamic capabilities, in this environment, they must be doing something right and there would be no need to change resources for the sake of changing. Over the long run, sensing and seizing capabilities are a basic requirement as there is a strong organisational learning component to long run growth.

8.7 Further research opportunities.

With dynamic capabilities being a relatively new construct, there would appear ample opportunity to develop the argument that for firms to grow in spite of external factors, firm strategy considering internal firm characteristics should be considered. The dynamic capabilities framework provides one such mechanism. The problem is this mechanism is relatively undeveloped, both in its practical understanding and application. What this thesis has attempted to achieve is develop a way forward to further understand what dynamic capabilities actually look like in a firm; how they are created, extended and modified; and whether they have an impact on sustained firm growth. With sufficient case studies and the use of comparisons, it is apparent some patterns have emerged. Some of these patterns have suggested there are relationships beyond the scope of the research questions. Two patterns in particular are developed to realise there are further research opportunities. These are the role the entrepreneur plays in the development of a firm's dynamic capabilities and the relationship between dynamic capabilities and the phases of firm growth.

8.7.1 Further research opportunity: dynamic capabilities and the entrepreneur.

Penrose suggested two managerial limits to growth; managerial ability and managerial uncertainty. The question was asked of all the owners / managing directors / CEOs in the interviews whether they aspired to grow. In all cases except Firm J, M and O, the case study firms aspired to grow. Some recognised that they needed to grow aggressively, like Firm N, whose managing director suggests, *"we do need to grow further, yes we do definitely we do need to grow, the company actually deserves to grow further. It's got to a point where it needs to grow. It needs to grow, probably to be blunt, it needs to grow to survive long term and I think it needs to grow into some different areas."*

Yet he lacked the motivation or “strategic obsession” to grow, illustrating a third managerial limit to growth (Shane et al, 2003). Other firms aspired to grow, but not as aggressively, like Firm F who have a more measured growth aspiration as the managing director commented,

“not growth for growth sake, in fact to get a broader base of clients and to get the business more stable than what we have been.”

These responses fall in line with research from the *Growing New Zealand Business* study that finds of the firms surveyed (1,762) “57% wanted to grow moderately and 20% wanted to grow substantially” (Growing New Zealand Business {GNZB}, 2011, p. 3). This result (77%) of firms wanting to grow broadly matches the 80% (12/15) of this thesis’ case study firms that aspire to grow.

The role of the entrepreneur is critical in this instance as the strategic intent or “obsession” (Hine et al, 2013) drives the aspiration to grow. The role of the entrepreneur in driving growth through a “creative response” (Schumpeter, 1947) to a perceived need, or driven by “profit motive” (Penrose, 2009 (1959)) to extend “financial power” or even extending a SMEs meagre resources to grow by “evolution with design” (Teece, 2009, p. 98) is one critical to driving growth. As the case studies above illustrate those firms with active, ambitious and structured entrepreneurs at the helm tend to take advantage of market opportunities and in most cases ward off external threats. In some cases they are not able to immediately ward off these threats, but are able to create, extend or reconfigure their resources to return to a path of profitable growth.

Dynamic capabilities offer a guide for the activities of the “entrepreneurial manager” (Augier & Teece, 2009) at various periods of growth despite the variety of market conditions. In the entrepreneurial firm, these periods of growth can be attributed to the sensing and seizing capabilities of the firm, either through their entrepreneurial orientation (Quince & Whittaker, 2003), experience (Deakins & Wyper, 2010), networks (Davidsson & Honig, 2003; Granovetter, 2005), knowledge and learning capabilities through the ability of the key managers (Augier & Teece, 2009). Where further research is possible for use to the entrepreneur is in examining the links between entrepreneurial orientation, experience, networks, knowledge and learning and their relationship with dynamic capabilities. There would appear to be a gap in this approach as Table 3.4 would suggest.

8.7.2 Further research opportunity: dynamic capabilities and the phases of growth.

Growth of the case study firms is non-linear, illustrating successes, challenges and triumphs often simplified in current literature (Garnsey et al, 2006). Nonetheless, this simplification does provide an opportunity to develop a practical mechanism with which to operationalise firm growth. The mechanism developed in this thesis provides a way to measure key dynamic capabilities processes at

key points (inflection points) along the firm's non-linear growth curves. What is noticeable from the case studies is that those firms that changed the way they did things at certain stages of their "non-linear" growth, tended to grow over time. When Firm A changed management after its initial period of steady growth, its size warranted a more formal management structure and an industry experienced person was hired. It is worth noting that the motivation to do so was the internal recognition (sensing) of the complexities of the firm's phase of growth and subsequent ability to seize the opportunity to bring in a resource to provide structure and direction. The ability of the firm to prevent the "leadership crisis" (Greiner, 1998 {1972}) having a detrimental effect on growth is attributed to the sensing and seizing capabilities. The result commenced a process of resource transformation. The dynamic capabilities evident at this period are summarised in Table 7.21 and illustrated in Figure 7.25.

The Greiner "evolution and revolution" (Greiner, 1998 {1972}) model is a useful "linear" apparatus with which to analyse whether dynamic capabilities influence the phases of firm growth. Briefly, the model suggests that firms grow in stable periods followed by chaotic periods of management upheaval. Each period requires different skills and processes in order for the firm to grow. Naturally if a firm is well prepared with a framework or model with which to "perceive, explain and predict" the impending growth phase crisis, it would stand a better chance at sustaining growth over time. The Greiner model is lacking in describing the processes required when a market decline invokes a crisis phase of firm growth. It is suggested that this is where dynamic capabilities have a role.

As Firm G found out, a market decline brought forward a crisis of autonomy as the general manager commented on the owner's strategic style,

"I've tried to steer him in different ways but he's a guy go hard, get a job and just do a job, that's it. There's no have tried to put in processes of where is he going (sic), what's the company structure, where does he want to be in a few years and things like that. But it's always been don't worry about that."

On the other hand Firm L, at a similar stage of growth to G at the time, utilised the market crisis as an opportunity to change its business model, governance and orchestrate its assets towards a more vertical operation. These processes averted the crisis of autonomy as the managing director commented on finding a mentor during the market downturn,

"he's been a mentor for a mate of mine and he has taken him from a very average business to a very successful business. So I am looking forward to having him on board."

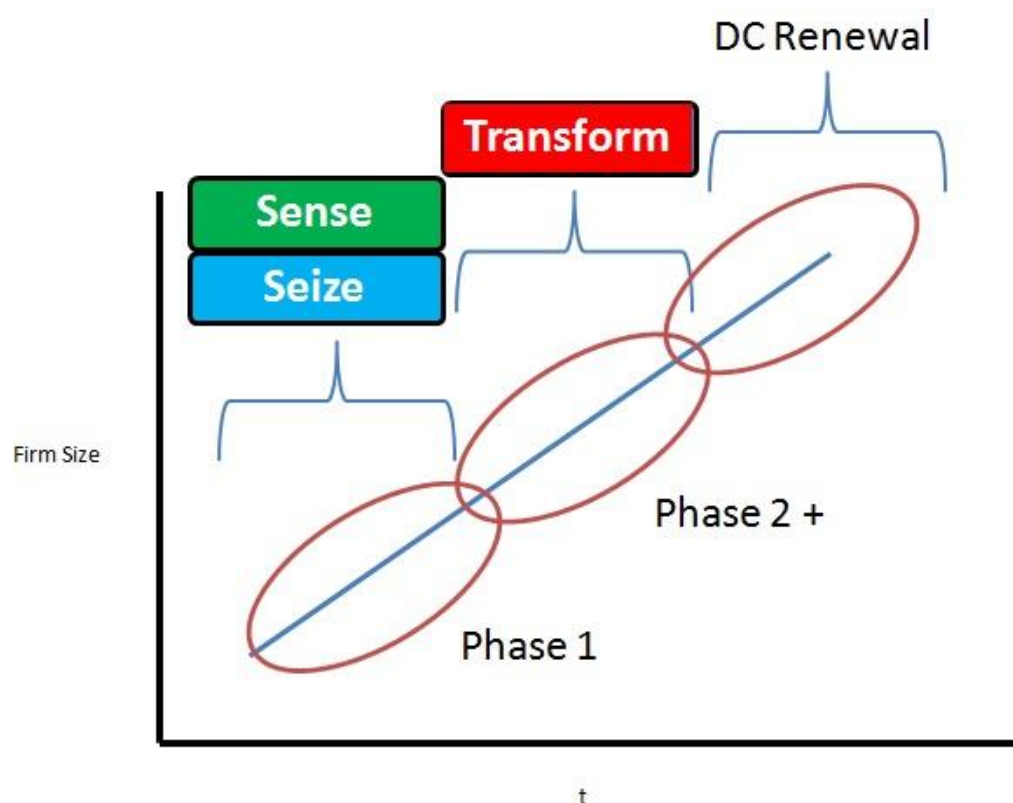
There is evidence from the case studies that sensing and seizing capabilities exclusively were predominant at early phases of growth (Figures 8.1 and 8.3). Transformational capabilities however

were more prominent at later phases of firm growth as Figure 8.5 above summarises. As new firms are less likely to have a range of established resources (Garnsey et al, 2006), the lack of resource transformational capabilities could be due to the lack of resources at the early stages of firm growth. The renewal evidence suggests that those firms that renewed their existing dynamic capabilities sustained their growth. The relationship between firm size and dynamic capabilities could be developed further to;

“place managers in a position to predict problems and thereby prepare solutions and coping strategies before a revolution gets out of hand” (Greiner, 1998 {1972}, p. 11).

The research thus far indicated that those firms that sustained growth exhibited dynamic capabilities at the stages indicated in Figure 8.9.

Figure 8.9 - Dynamic capabilities and the phase of firm growth.



It must be emphasised that this is a summary of observations from the research that does not focus on the phase of firm growth. Further research defining the traits of the phases of firm growth using firms of similar size and date of firm creation as the case studies is identified as an opportunity. Defining a research project thus would a priori remove any criticism that the research is relying on a “mass of undigested empirical findings” (Garnsey et al, 2006, p. 4).

Dynamic capabilities provide a useful framework with which to understand how firms can grow sustainably within an industry context. The dynamic capabilities framework is lacking in its operational application however. The weakness is threefold: providing a constant context; providing a practical model with which to explain how dynamic capabilities influence sustained firm growth; and seeking out evidence of existing dynamic capabilities. This thesis provides a mechanism with which to overcome these three weaknesses. By analysing processes uncovered through examining a firm's key management skills and testing them for evolutionary fitness, evidence of dynamic capabilities can be uncovered. The case study firms are all privately owned, domiciled in New Zealand and all subject to various New Zealand energy indices. These include the value of New Zealand imported oil and gas pipe, giga-watt of geothermal energy produced in New Zealand, coal and petroleum product production in New Zealand and the New Zealand manufacturing output index (for Firm N, selling and servicing machinery to the manufacturing industry, energy included).

What is apparent about these case study firms is that they all derived the bulk of their revenue over time from the energy industry, but not necessarily exclusively. Firms at times derived income from industries as varied as dairy, food, agriculture, utilities other than power and general manufacturing. As the industry growth opportunities rise and fall, indicated by the various energy industry indices, firms have the opportunity to "decouple" their growth trajectories from over-reliance in market led growth. This decoupling must be a strategic activity, not ad-hoc. It must also include a process approach to understanding what the firm's strategically competitive resources are, ensuring that they have sensing, seizing and transforming capability processes in place and thence renewing them. This suggestion is a simple one to make, but needs a further framework with which to operationalise. The preparation of a mechanism to utilise dynamic capabilities required a process oriented approach (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). The relationships between sensing, seizing and transformational dynamic capabilities are summarised above, what is now required is a framework with which a firm can "institute the disciplines to execute on that opportunity [for growth]" and "stay agile so as to continuously refresh the foundations of its early success" (Teece, 2009, p. 60) and thereby sustain growth.

Chapter 9: Conclusion.

9.1 Introduction.

The New Zealand energy industry is responsible for one of New Zealand's largest exports: crude oil, and the highest contribution to GDP per worker at \$330 (MBIE, 2014). Many of the firms operating in this industry are SMEs (Venture Taranaki, 2015). SMEs in New Zealand also represent an opportunity for a major source of employment (Dobbs & Hamilton, 2007; MED {MBIE}, 2011b). It is therefore in New Zealand's interest to grow this sector.

SME growth is a complex, yet important consideration for New Zealand. Most firms aspire to grow, some do not. It is evident from the case studies presented in this research that the owners / managers of firms, M and O, that do not aspire to grow, do not. Yet both the owners of Firms M and O express a desire to sell a profitable concern. Of the firm performance measures, profitable growth is used as a pre-requisite for sustained growth. With limited resources, SMEs have no control over the economic environment in which they operate. This environment provides market opportunities and threats. The question then is how SMEs recognise opportunities and threats, strategically adjust their firm processes and modify their resources to continue to grow. From the design and learning schools of business strategy (Mintzberg & Lampel, 1999), the dynamic capabilities framework offers an opportunity to understand how a firm may identify opportunities and threats, take advantage of these opportunities or mitigate threats to the firm, then modify their key resources and capabilities in order to sustain growth (Teece et al, 1997; Teece, 2007; Teece, 2009; Winter, 2003). Dynamic capabilities are defined as the;

“capacity (1) to sense and shape opportunities and threats (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting and when necessary, reconfiguring (or transforming) the business enterprise's intangible and tangible assets” (Teece, 2007, p. 1319).

Dynamic capabilities are clearly defined as per the above yet they are not easy to measure, quantify nor identify. This thesis presents an opportunity to overcome these shortcomings by developing an operationalised mechanism by which dynamic capabilities can be measured for their influence on sustained firm growth, even in the face of exogenous growth factors. Yet as the firm's external economic environment changes, the factors enabling a firm to achieve a competitive advantage diminish. As Helfat & Peteraf (2003) point out, these capabilities have a lifecycle of relevancy and they need to be renewed. The four research questions ask:

“How do sensing capabilities influence firm growth?”

“How do seizing capabilities influence firm growth?”

“How do transformational capabilities influence firm growth?”

“How does the renewal of dynamic capabilities influence firm growth?”

9.1.1 Theoretical contributions.

The dynamic capabilities framework offers an explanation as to a firm’s internal mechanisms can control how its strategic position can be sustained, yet it is also obscure in how they are connected to firm growth (Kraatz & Zajac, 2001; Kuuluvainen, 2012; Winter, 2003). Before the research questions could be adequately answered, this obscurity was required to be overcome in the development in a practical mechanism by which dynamic capabilities can be measured for their effectiveness on sustained firm growth. Fortunately Teece (2007, 2009) does point out that underpinning dynamic capabilities are key management skills. These are a useful construct with which to search out the micro-foundational processes that explicate dynamic capabilities. Despite firm growth in general not being “an appropriate measure of performance for all types of dynamic capabilities and in all situations”, firm growth can,

“provide an extremely useful performance measure in certain environmental contexts” (Helfat et al, 2007, p. 17).

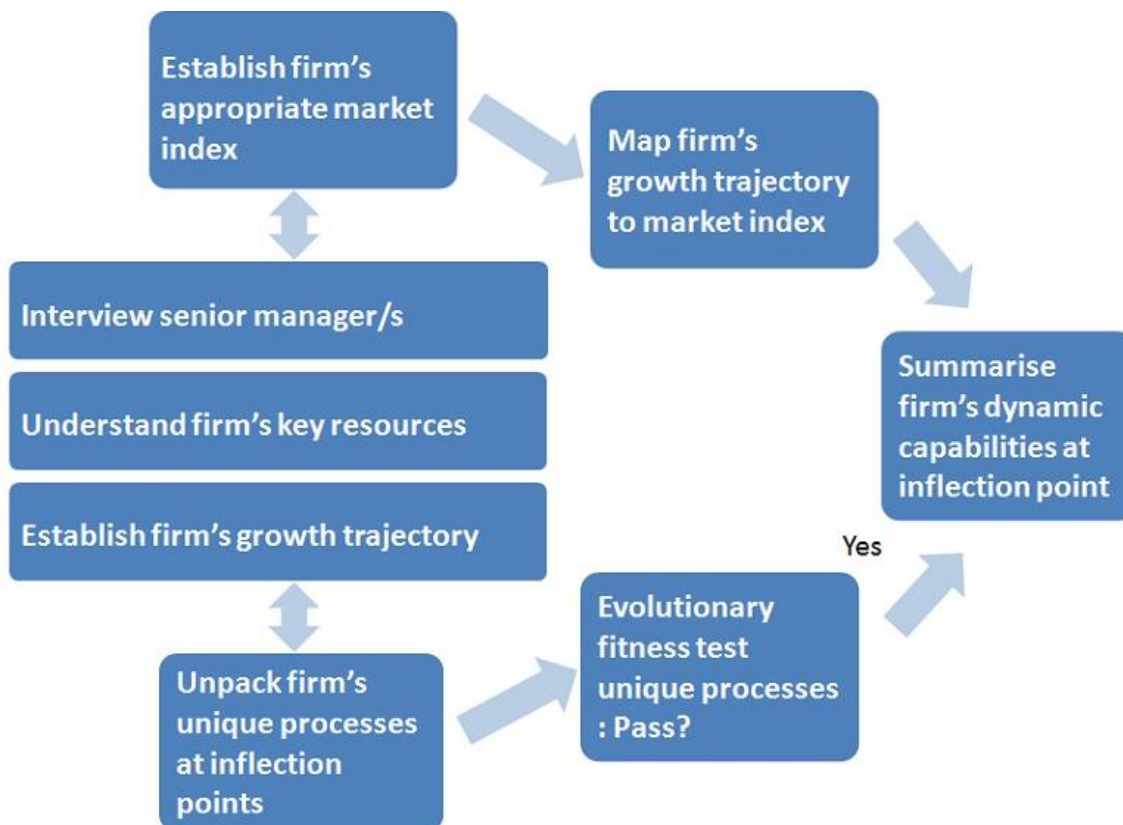
A critical theoretical contribution of this thesis is the development of a dynamic capabilities measurement mechanism that involved identifying the unique dynamic capabilities processes at inflection points along a firm’s growth curve. The processes were uncovered for their effectiveness in influencing firm growth by examining the key management skills, which underpin dynamic capabilities. The matter of whether these unique processes contribute towards sustained growth is dealt with by juxtaposing the firm’s growth curve on the firm’s main industry growth index. The indices are all related to the New Zealand energy industry, important to maintain the constant context required for reliable dynamic capabilities research (Helfat et al, 2007). Firms chosen are SME engineering firms, further refining the “environmental context.” On this basis, the “applicability” of dynamic capabilities with respect to firm growth is extended beyond existing studies. As there are only few existing and limited studies (Table 3.4) linking dynamic capabilities to aspects of firm growth, there is a research opportunity to explore the “width” of this relationship. The research examines a firm’s dynamic capabilities, manifested in its unique processes (Bingham et al, 2007; Narayanan et al, 2009) and their “real world” (Yin, 2010) relationship with firm growth. A qualitative method was chosen to unlock the “obscure” mechanisms of firm growth (Garnsey et

al, 2006). Fifteen case study firms were examined for growth against the backdrop of New Zealand energy industry performance, represented in various indices. To refine the context in which these SMEs (the unit of analysis) operate, interviews were conducted with several industry organisations and a publically listed energy firm.

The predominant challenge when assessing whether dynamic capabilities influence firm growth is that of understanding what dynamic capabilities are in an operational sense. Fortunately because “top management leadership skills are required to sustain dynamic capabilities” (Teece, 2009, p. 37), querying the “top managers” or “leaders” of the case study firms in a semi-structured interview setting, an understanding of what and when these skills were evident offers an opportunity to understand dynamic capabilities processes. The five key management skills; learning and knowledge management, governance, business design, investment allocation and asset orchestration were used as a basis with which to operationalise dynamic capabilities. Dynamic capabilities’ processes at the firm’s growth inflection point were tested for evolutionary fitness: whether these processes created, extended or modified the firm’s resource base (Helfat et al, 2007). Codes were developed in order to summarise evidence of dynamic capabilities at the particular inflection point they were implemented or modified (renewed). The implementation of these processes at particular stages of a firm’s growth was mapped alongside the firm’s key market opportunity index.

The research opportunity exists to find a relationship between dynamic capabilities and firm growth to add to the conceptual framework (Helfat et al, 2007). The conceptual framework is developed to offer an empirical one by which a firm can optimise internal growth opportunities. It is not only the answer to the research questions that this thesis offers a theoretical contribution, but also in establishing a process to test whether a firm’s unique processes are evolutionary fit at a particular growth inflection point. Presented in the format following Yin’s (2010) phases of case study analysis (Figure 5.2), Figure 9.1 illustrates this process.

Figure 9.1 – Dynamic capabilities and firm growth operationalisation process.



9.1.2 Industry contribution.

Chapter 2.6 noted that research exists illustrating how dynamic capabilities influence larger multinational firms' sustained growth; however current research of their influence on SME growth is inadequate. This research not only develops a process to operationalise dynamic capabilities but also to further develop an understanding of how dynamic capabilities influence SME growth. The research methodology developed in this thesis allowed the richness of the data to be captured in the dynamic capabilities summary tables (Appendix D) and illustrated in Chapter 7.3. This research broadly supports the view that the presence of dynamic capabilities is a positive factor for firm growth, as those firms exhibiting a preponderance of dynamic capabilities are firms that sustain growth. The research highlights that it is in the nuances where the relationships can be found between sensing, seizing and transforming capabilities and growth.

When a firm is in a declining profitable situation yet there are increasing market opportunities, in order to sustain growth, the firm needs to implement or renew its sensing and seizing capabilities. These capabilities are summarised in Tables 3.1 and 3.2.

When a firm is in a declining profitable situation and there are decreasing market opportunities, in order to sustain growth, the firm needs to implement or renew its transformational capabilities. These capabilities are summarised in Table 3.3.

Some of the case study firms were satisfied to grow with market led growth, Firms G, J, N and O for example, yet did not sustain their growth when the market declined. Other firms such as B, D, E, H and P did sustain their growth and others (Firm A, F, I and L), improved their profitability when they transformed their resources despite growing along with market opportunities. Therefore it is suggested that when firms are growing profitably in periods of market led growth, they need to transform their resources. The conclusion therefore is that firms that are in a positive growth situation have a strategic opportunity to implement or renew transformational capabilities as per Table 3.3. Rather than rest on their laurels, firms aspiring to sustain growth must take the opportunity to proactively review the long term relevancy of their resources.

Firms finding themselves in a position where they are achieving above average profits in a declining market, need not review their dynamic capabilities as this implies they have achieved a strategic competitive advantage. They must be sensitive however to any changes in market or firm growth, including declines in firm profitability.

Figure 9.2 is offered as an “empirically relevant paradigm” with which to ensure an engineering firm operating in the New Zealand energy industry is able to take advantage of market opportunities, mitigate market threats and prepare itself for these external changes in opportunities when it is able to, and in so doing, sustain growth.

Figure 9.2 – Dynamic capabilities sustainable growth matrix.

	< Profits	> Profits
Industry Growth	<div style="background-color: green; color: white; padding: 5px; text-align: center;">Sense</div> <div style="background-color: blue; color: white; padding: 5px; text-align: center;">Seize</div>	<div style="background-color: red; color: white; padding: 5px; text-align: center;">Transform</div>
Industry Decline	<div style="background-color: red; color: white; padding: 5px; text-align: center;">Transform</div>	

It is important that a firm should regularly check the “relevancy”, “fit” or “health” of its dynamic capabilities processes. Figure 9.2 is not suggesting that at the various quadrants, other dynamic capabilities are not necessary or important. As has been observed, it is often the case that dynamic capabilities operate in tandem. For example, in order to transform a firm’s resources, as per Firm K’s case when they realised that further profitable growth was going to come from international opportunities, a strong sensing capability was required.

Dynamic capabilities’ renewal processes offer an explanation - as the lifecycle view of capabilities do - to, “explain the sources of heterogeneity for firms in which the capabilities reside” (Helfat & Peteraf, 2003, p. 1009). The renewal of sensing, seizing and transformational capabilities is necessary at points along its growth trajectory. As some of the renewal processes uncovered from the cases were reactionary (Firms E, F, L and N for example), a practical suggestion for firms in the industry is to ensure there is a pro-active dynamic capabilities evolutionary “test” at regular intervals (Figure 8.8). The relationships summarised in Figure 9.2 provide a practical framework (matrix) with which to ensure a firm operating in the New Zealand energy industry is able to create, extend or modify its existing resources through implementing or renewing dynamic capabilities.

9.1.3 Application of the research.

New Zealand’s fourth largest export is oil (PEPANZ, 2015), supporting many businesses, large and small. The wealth this sector creates is significant, with not only high value wages, technologies, but also royalties (NZD1.5 billion from 2011-2015) and tax (NZD300 million in 2015 alone). Whilst there are many large international and listed firms operating in this industry, there are also a few large locally owned firms as well as many smaller ones that “face the challenges of any smaller business” (Venture Taranaki, 2015, p. 83). Some of these challenges include changing the stakeholders’ mind-sets that the:

“resources most able to effect economic transformation are not those that lie deep beneath our feet, but the people who continue to apply leadership, innovation, and an entrepreneurial spirit to the industry” (Venture Taranaki, 2015, p. 1).

If this change is to occur, then it the activities of the (largely) entrepreneurs in the industry, such as the managing directors of the case study firms that could benefit from an understanding of how their firms can continue to sustain growth over time as the market opportunities wax and wane. Reaching the entrepreneurs in the industry, particularly those owner managers in SMEs is a challenge. In an entrepreneur’s limited arsenal of assets are network resources: direct (Davidsson & Honig, 2003) or indirect (Granovetter, 1973; Granovetter, 2005). These mechanisms have already

been used as a means by which to engage the entrepreneur in the discussion on sustainable growth (Thomson, 2015a; Thomson, 2015b). Those entrepreneurs who have not been able to sustain growth, yet still have an opportunity to, namely Firms J, M, N and O (except G) could benefit from understanding what they need to do internally to realign their firms towards growth. The dynamic capabilities framework would appear to remove the excuse that a firm cannot grow because, *“it was just quiet. We just went quietly. We sort of, what was happening was we were losing all the other work”* (managing director Firm M).

The examples of Firms A, E, F, I, K, L and P illustrates that it is possible to turn growth around, as long as the aspiration is there (Shane et al, 2003). If the dynamic capabilities sustainable growth matrix can assist with overcoming these challenges by assisting the entrepreneurs to focus on their internal firm capabilities in any particular market condition, then we are closer to a model with which to “perceive, explain and predict” (Pitelis, 2002) the internal mechanisms of firm growth.

9.2 Limitations of the research.

In Chapter 3, several limitations were identified prior to the research being undertaken. These limitations were firstly acknowledged and then mitigated by thoroughly preparing the research process. The cases were prepared prior to analysis to limit any possible effects of cognitive bias (Eisenhardt, 1991). Cases were prepared from multiple sources of information, ensuring a strong element of “granularity” exists (Helfat & Winter, 2011).

Dynamic capabilities do not guarantee success or “riches” as noted by Winter (2003), but they can prepare the firm to better respond to exogenous and endogenous opportunities and threats to sustain growth over time. As there is very little evidence of dynamic capabilities’ research relating to firm growth, a possible limitation could be the methodology used in which to analyse the data. Examples of recent studies examining dynamic capabilities and their effect on some aspect of firm performance is summarised in Table 3.4. The methodologies vary greatly. The use of a qualitative methodology using case studies (Aramand & Valliere, 2012; Evers et al, 2012; Kuuluvainen, 2012; Schlemmer & Webb, 2008) does extract the richness of the firm’s growth story (Eisenhardt & Graebner, 2007). This is necessary in order to uncover the key firm processes associated with dynamic capabilities. Nonetheless, this thesis seeks to build on these recent studies to further add to the conversation of how dynamic capabilities influence firm growth.

A potential limitation of this research is the difference in ages of the firms. Analysing firms of different ages could present a problem with the comparative aspect of firm growth (Garnsey et al, 2006). As dynamic capabilities are concerned with how a firm responds to external threats and

opportunities, comparisons are not made in this thesis between firms' growth, they are made between firm growth and market growth opportunities, and data gathered is process related, all irrespective of firm age. Naturally the requirement to contextualise the study to SMEs operating in the New Zealand energy industry does impose a limit to the applicability of the research and its findings. Some key themes are evident, namely that there is a strong element of entrepreneurial resource at the early stages of firm growth and that the case studies' growth trajectories broadly follow phases of firm growth. Both these are elements of the generally accepted understanding of Barney's (1991) firm resource theory and Greiner's (1998{1972}) phase of firm growth model. This role of the entrepreneur in establishing a firm with a strategically intentional growth trajectory is an area where,

“the experience of a firm's managerial group plays a crucial role in the whole process of expansion, for the process by which experience is gained is properly treated as a process creating new productive services,” (Penrose, 2009 (1959), p.43).

Developing these themes further would expand this thesis' applicability; further research in the entrepreneurial and phase of growth area of is suggested.

9.3 Further research opportunities.

Dynamic capabilities' microfoundations (Teece, 2007; Teece, 2009) were utilised a priori to identify key processes. This research has opened up an opportunity to understand which microfoundations contribute to sustained firm growth in a specific industry context. This has the potential to offer the entrepreneur which process associated with dynamic capabilities contributes predominantly to sustained growth. An industry specific microfoundation hierarchy might be useful for the entrepreneur to focus on the processes which would garner the most effective growth outcome for a particular stage of an industry's growth (or even stage of firm growth).

Understanding the influence the entrepreneur has on firm specific dynamic capabilities has been identified as an opportunity to expand on how dynamic capabilities influence firm growth. The low key argument Teece (2007, 2009) puts forward for key management skills underpinning dynamic capabilities processes is also a possible area to expand on the entrepreneurial relationship. They are used in this thesis as an a priori basis with which to extract process related data. Key dynamic capabilities processes associated with recognising the firm growth opportunities rely on the ability of the firm, through its entrepreneurial orientation (Quince & Whittaker, 2003), dynamic entrepreneurial learning (Deakins & Wyper, 2010) and strategic intent (Eisenhardt & Martin, 2000; Hine et al, 2013) in order to see that the opportunities lie in the industry growth itself. It is not only

the entrepreneur's role in understanding the "relevant demand" to the firm (Penrose, 2009 (1959)) the market provides through sensing capabilities and capture and make profitable use of the market opportunity through seizing capabilities that requires further understanding. Transformative learning capabilities within the firm (Politis, 2005) then lead it to develop a profitable growth path on the back of the industry growth opportunities. Augier and Teece (2009) also suggest that the, *"dynamic capabilities framework invites further research into entrepreneurship, organizational learning, and the role of managers and leaders in enterprise performance."* (p. 418).

As the firm grows, the creative contribution of the entrepreneur makes way for the directional and increasing organisational contribution of the manager's role (Greiner & Bhambri, 1989; Greiner, 1998 {1972}). This contribution presents an opportunity to understand whether dynamic capabilities play a role in successful growth phase transition.

As noted in Chapter 8, sensing and seizing capabilities were found to contribute to sustained growth at the entrepreneurial phase of firm growth. Transformational capabilities were found to contribute to sustained growth later on in a firm's growth trajectory. This opens up the question of whether there is a relationship between dynamic capabilities and the size (Garnsey et al, 2006) or phase of growth (Greiner, 1998 {1972}) of the firm.

9.4 Closing statements.

Finding a way in which to understand firm growth is fraught with challenges as many aspects have to be considered, including;

"strategies, entrepreneurial motivation, management team composition, organizational form, financial structure, and various aspects of relative environmental munificence" (Delmar et al, 2003, p. 212).

It is hoped that addressing the calls to understand dynamic capabilities and their relationship with growth will go some way to understanding firm growth through one of the "theoretical tools" available. The dynamic capabilities framework has been applied here to an important industry for New Zealand, and to an important subset of firms operating within this industry. This context boundary (Foley & Fahy, 2009; Helfat et al, 2007) provides a "Petri-dish" within which to analyse the case studies for evidence of dynamic capabilities processes. Arriving at a methodology to seek out dynamic capabilities related processes proved challenging. The dynamic capabilities' framework claims that firms with dynamic capabilities experience sustained growth. Yet it was only after developing a process related understanding of dynamic capabilities that an operational tool was developed with which to extract and analyse data from the case studies. The dynamic

capabilities key management skills provide the link between the theory and practice required. Evolutionary fitness provided the “test” with which to check the processes for their contribution to a firm’s strategic growth. Future firm growth research utilising the dynamic capabilities framework now has an operationalised mechanism with which to objectively analyse the underlying processes and measure these for evolutionary fitness. Development of this process is hoped to have a practical application in the New Zealand energy industry and beyond. It is in answering the research questions that a practical contribution to the growth of the energy industry in New Zealand is made.

Sensing capabilities are found to be most applicable to sustained growth at periods where markets offer growth opportunities and where the firm is experiencing a low profit situation. Seizing capabilities are found to contribute to sustained growth when they are implemented or renewed at periods when the market offers growth opportunities and the firm is experiencing a low profit situation. Transformational capabilities are found to contribute to sustained growth when they are implemented either at a market decline and low firm profit situation or where the market offers a growth opportunity and the firm is in a positive profit situation.

As Venture Taranaki’s *The wealth beneath our feet* (2015) recognises,

“What is known is that the future will not be more of the same. Shifting public perceptions, evolving technologies, more challenging exploration locations, and tightening investment decisions will all impact on the shape of New Zealand’s oil and gas industry going forward” (p. 7).

Given that SMEs in particular, with their limited resources (entrepreneurial resources included), will be affected by this uncertain future, then the development of their understanding of dynamic capabilities in a practical sense would appear to benefit their goal of sustained growth.

9.5 Looking ahead.

One of the challenges, I, as a SME owner had, was resisting the impulse to react to external forces beyond my control. This reaction often times was not strategy related and only designed to survive the next trading cycle. With two firms in New Zealand and one in Australia, it was apparent that they were subject to very similar external dynamics. If I had some insight at that period of my professional life on how I might have better reacted, let alone strategically analysed the firm’s internal processes in relation to the market, I may very well have withstood the deleterious effects of the GFC. As a passionate New Zealander I hope to develop a discourse with New Zealand industry to ensure that entrepreneurs are able to develop strategies, skills and processes to sustain growth. The dynamic capabilities framework is expected to be part of this discourse. In fact I have already begun to engage

formally with several industry organisations which represent many SMEs in the New Zealand energy industry. The owners / managers of the case study firms have varying backgrounds, some with trade backgrounds, some with tertiary academic qualifications and others with none. They all appeared to be connected with different networks, whether socially, industry or family wise. It is in these networks that the possibility exists to engage in a sustainable growth discourse with these owners / managers.

With additional empirical study on dynamic capabilities' effects on other aspects of firm growth factors, a complete picture of what is required within a firm in order for it to sustain growth can be developed. In the meantime, the "dynamic capabilities sustainable growth matrix" could be proposed as a start with which to practically assess a firm for its preparedness for changing external forces. Teece et al (1994, 1997, 2009) identified the failings of existing strategic methodology as being too static, too focused on factors exogenous to the firm. The time is right (in New Zealand in particular) for strategy advice, teaching and engagement to be about what the firm can control and the endogenous mechanisms with which to do so. This thesis is expected to contribute to this discourse.

Appendix A - Process of data gathering.

1.0 Primary data:

- 1.1 Identify target firms meeting the criteria described in my methodology as best as possible.
- 1.2 Identify key potential interviewees in these organisations.
- 1.3 Prepare PIS final template.
- 1.4 Prepare questions designed to gain insight into the research questions.
- 1.5 Contact key potential interviewees on a “rolling”, systematic and locational basis by phone.
- 1.6 Suggest a date, time and quiet location to conduct the interview.
- 1.7 Follow up immediately with a PIS.
- 1.8 Follow up phone call to interviewee to confirm a date for the interview.
- 1.9 Conduct interview:
 - 1.9.1 Be on time!
 - 1.9.2 Introductions and pleasantries.
 - 1.9.3 To the best of the interviewer’s ability ensure the environment is undisturbed.
 - 1.9.4 Note any observations in field notes.
 - 1.9.5 Ask permission to record the interview.
 - 1.9.6 Conduct interview according to interview guide.
 - 1.9.7 At the conclusion ask permission to conduct further interviews if required.
 - 1.9.8 Ask if further contact is possible to seek clarification of any matters discussed.

2.0 Secondary data:

- 2.1 Secondary interview based data:
 - 2.1.1 Identify institutions associated to the industry.
 - 2.1.2 Identify key potential interviewees in these organisations.
 - 2.1.3 Prepare PIS final template.
 - 2.1.4 Prepare questions designed to gain insight into the research questions.
 - 2.1.5 Contact key potential interviewees on a “rolling”, systematic and locational basis by phone.
 - 2.1.6 Suggest a date to conduct the interview.
 - 2.1.7 Follow up immediately with a PIS.
 - 2.1.8 Follow up phone call to interviewee to confirm a date for the interview.
- 2.2 Secondary publically available search data:
 - 2.2.1 Online search of publically available information of above firms and institutions. Confirm certain quantifiable facts. Note these in field notes.
 - 2.2.2 Keep a watch on industry publications for developments associated with the industry and firms.
 - 2.2.3 Note any developments through third party information.

Appendix B – Interview Guide.

Interviewee _____ **Date** _____

1. Background.

1.1. Owner-manager background.

Your background and career, and how you got involved. _____

History of the business, about your top management team, board of directors, and advisors. _____

Who makes and how are strategic decisions made? (top-down vs bottom-up). _____

1.2. Industry understanding.

Describe products and major competitors. _____

How has the business adapted to market changes (products; innovation; ways of doing business)? _____

How do you acquire new customers or business? _____

How do you understand what your customer or the market needs? _____

Do your customers ask for products you do not produce? If yes, how do you accommodate their requests?

2. Growth: Business structure development and growth.

Do you aspire to grow and to what extent? Why? _____

How do you measure growth? Considering the growth metric, what has your business experienced since inception?

Do you have a written business plan? _____

Makeup of costs, sales, profit, employees, ownership, and trends over time. _____

What were the initial barriers and challenges and how did you overcome them? _____

To what extent is growth regionally or internationally important? _____

Will interacting with other companies, institutions or government agencies help you achieve your objectives?

2.1. Resource development.

What key competencies are important for your business and how did you develop them? _____

How do you ensure your customers choose your company to trade with? _____

How do you use information from, and involve staff in decisions? _____

What activities do you personally focus on and why? _____

How are you involved in these activities? _____

Do you look at the value-adding activities to see how you can streamline the supply of product to customers? If yes how? Example. _____

Do you look to bundling products with those from other businesses? Example. _____

Do you hold and manage Intellectual Property? _____

Are you engaged in outsourcing and/or insourcing? If yes, why? _____

How do you review your business to see whether new processes and/or technology could be of benefit?

3. Dynamic Capabilities –

3.1 Key skill A: learning and innovation process.

How have you acquired and developed relevant skills and knowledge? Approximate time line? _____

What specifically do you need to understand about different markets to be able to develop your business? _____

Do you keep up to date about new processes and technologies? If yes how? _____

What kinds of knowledge or technology do you try to acquire (e.g. managerial capabilities, IP)? How?

Would you make any changes to your products or processes if you could? If yes what's stopping you? _____

Do you share knowledge and or investment with other organisations and businesses? If yes what key benefits have been obtained? _____

3.2 Key skill B: efficient governance and incentive alignment.

How do you manage the company now? Are there inputs from formal or informal advisors? _____

Does this differ from how you have managed it in the past? If yes, describe the impact. _____

Do you have a forum to encourage diverse honest feedback and opinion from all staff? _____

How do you incentivise your management team? _____

Have you changed any significant aspect of your company governance structure or incentive? If yes, what effect did it have? _____

3.3 Key skill C: business design.

What major changes have you made to your business that resulted in an increase in revenue? _____

Have you or do you look at other ways of making more money from your products? What were they? _____

Do you know and understand the business costs of your partners, distributors/customers, suppliers, and competitors. _____

How would your business structure differ from that of your competitors? _____

3.4 Key skill D: investment allocation.

How do you fund your businesses expansion/growth? _____

Has the investment been consistent over time? _____

If not, what effect on your business has the variance on investment had? _____

How do you manage investment in employee development? _____

3.5 Key skill E: asset orchestration.

Of your key resources which ones did you directly control? _____

How has your attention to key resources changed over time, and have they changed? _____

4. Past successes, past failures. Reflection.

In hindsight, what would you do differently today? _____

Future aspirations and where do you see the business in 5 years? _____

What advice would you give to a new CEO about the industry? _____

1.1. Owner-manager background.
 Your background and career, and how you got involved Pipe beyond. Think big!
 History of the business, about your top management team, board of directors, and advisors. _____
 Who makes and how are strategic decisions made? (top-down vs bottom-up) Director in business.

1.2. Industry understanding
 Describe products and major competitors. Engin Samu. Power/Water/Geo.
 How has the business adapted to market changes (products; innovation; ways of doing business)? Key MP/Power Experience.
 How do you acquire new customers or business? Referral / Network. Long staff. Good Staff Board.
 How do you understand what your customer or the market needs? ✓
 Do your customers ask for products you do not produce? If yes, how do you accommodate their requests? ✓

2. Growth: Business structure development and growth.
 Do you aspire to grow and to what extent? Why? Up to 100. Personal touch. Limitation.
 How do you measure growth? Considering the growth metric, what has your business experienced since inception? Turnover / Profit
 Do you have a written business plan? Yes 10 years ago.
 Makeup of costs, sales, profit, employees, ownership, and trends over time. ✓
 What were the initial barriers and challenges and how did you overcome them? MME'S. QMS.
 To what extent is growth regionally or internationally important? Response to both.
 Will interacting with other companies, institutions or government agencies help you achieve your objectives? in the industry
Gen NE JMG, SAMZ, ADIA; SIDC.
No one expects to grow.

Appendix D – Case study dynamic capabilities summary tables.

Firm A – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ2SEIZBUSMODEL	2000	Interview	Learning and knowledge management, business design, investment allocation and asset orchestration.	Designing revenue architecture and mechanisms to capture value.	Disparate engineering consultancies got together to create a larger business.	Multiple resource linkages; multiple sources of linkages.	Fast growth for 3 years.
RQ2SEIZBOUNDARIES RQ2SEIZLOYAL	2003	Interview	Learning and knowledge management, governance, business design, asset orchestration.	Controlling bottleneck assets (in the value chain).	The MD realised that he became the bottleneck of firm progress. Shareholding was altered to allow staff to buy into the business.	Multiple resource linkage.	Steady growth.
RQ2SEIZLOYAL RQ3TRANSDECENTRAL RQ3TRANSGOV	2008	Interview	Governance, Business design, Investment allocation, asset orchestration.	Recognising inflexion points and complementaries; a turning point occurs which changes the way of thinking and acting.	The new CEO brought a change in the way the business operated in relation to governance, agency, loyalty, alignment of resources and knowledge management.	Multiple resource linkages.	Greater profitability.
RQ1SENSETRATR&D RQ2SEIZBUSMODEL RQ3TRANSCOSPEC	2008-2010	Interview & publications.	Learning and knowledge management, business design, investment allocation and asset orchestration.	Selecting technology and product architecture, introduced new	Intentionally sought out and purchased businesses to augment service offering and grow competencies.	Technological bases facilitating diversification.	Accelerated profitable growth.

RQ2SEIZBOUNDARIES RQ3TRANSCOSPEC	2009-2010	Interviews & publications.	Learning and knowledge management, business design, investment allocation and asset orchestration.	services, business model. Undertook collaborative and alliance activities.	Signed formal alliances with key industry firms.	Multiple sources of linkages, collaborative activity.	Wider marketing and service offering during a period of growth.
RQ1SENSMKTR&D RQ3TRANSCOSPEC	2013	Interviews.	Learning and knowledge management, investment allocation and asset orchestration.	The business has expanded marketing and now business offshore.	The focus was on seeking opportunities outside of the NZ market in a rapid response to the NZ market diminishing.	Multinational enterprise, technological bases, market bases, related links, response to external threat.	Greater geographic reach. Greater service offering.

Firm B – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	2008	Interview, literature, observation.	Learning and Knowledge Management.	Identification of target market segments, changing customer needs and innovation.	This set up the firm and to an extent the flexible firm culture.	Market bases, multiple resource linkage, technological bases.	Steady firm growth for 4 years.
RQ1SENSMKTR&D RQ2SEIZBUSMODEL RQ2SEIZBOUNDARIES	2012	Interview, publically available information, observation.	Learning and Knowledge Management, Business Design, Investment Allocation, Asset Orchestration.	Selecting target customers, designing revenue architecture and mechanisms to capture value.	Understanding the limitations of the business , outsourcing became evident and is now part of the firm’s modus operandi.	Multiple sources of linkages, market bases, related linked expansion.	Increased business growth.
RQ2SEIZDECISION	2012	Interview and observation.	Learning and knowledge management, Governance, Investment Allocation, Asset Orchestration.	Selecting decision making protocols.	Procedures and systems introduced.	Multiple resource linkages, response to external threats.	Increased business growth.
RQ2SEIZDECISION RQ3TRANSGOV	2014	Interview and publically available information.	Learning and Knowledge Management, Governance, Business Design, Investment Allocation, Asset Orchestration.	Governance change.	The limits to growth were identified and the inactive business partners bought out. Decisions much easier to effect.	Internal influences, response to external threats.	Increased business growth.

Firm D – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	2003	Interview & firm data.	Learning and Knowledge Management.	Processes to identify target market segments, changing customer needs and customer innovation	Inherent experience and skill sets picked up at the start of the new business courtesy of the entrepreneurial activities of the managing director.	Market bases, Technological bases facilitating diversification.	Steady growth for 6 years.
RQ1SENSEXTR&D	2003	Interview & firm data.	Learning and Knowledge Management.	Processes to acquire supplier and complementor innovation.	The managing director continued to attend and participate in strategically relevant trade shows and industry organisations.	Multiple resource linkage. Technological bases facilitating diversification.	Steady growth for 6 years.
RQ3TRANSKNOWL	2003	Interview and observations.	Learning and Knowledge Management.	Learning and knowledge transfer.	Learning and IP is established as part of the culture of the organisation.	Multiple resource linkage, technological bases, related linked expansion, collaborative activity.	Steady growth for 6 years.
RQ2SEIZDECISION RQ2SEIZLOYAL RQ3TRANSDECENTRAL RQ3TRANSGOV	2009	Interview & firm data.	Learning and Knowledge Management, Governance, Business Design, Investment allocation, Asset Orchestration.	Processes to identify target market segments, changing customer needs and customer innovation	The new General Manager brought a change in the way the business operated in relation to governance, agency, loyalty, alignment of resources and knowledge management.	Multiple resource linkages.	Slightly accelerated growth, growth in corporate customer bases and geographic growth.

Firm E – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSEXTR&D RQ2SEIZBOUNDARIES RQ3TRANSKNOWL	1997	Interview	Learning and Knowledge Management, Business design, Asset orchestration.	Processes to acquire supplier and complementor innovation. Assessing appropriability. Recognition and capturing co-specialisation economies.	The firm actively sought out a specialised accreditation which enabled it to protect its position in the market and work closer with collaborators. Used complementary products provide by others.	Multiple resource linkages; multiple sources of linkages, collaborative activity, technological bases facilitating diversification.	Steady profitable growth for 12 years.
RQ2 SEIZLOYAL RQ3TRANSGOV	2000	Interview, publically available information.	Governance, Business design, Investment allocation, Asset orchestration.	Building loyalty and commitment. Incentive alignment.	The MD realised that he had to secure the skills and reward loyalty of his key staff and offered them shareholding in the business.	Multiple resource linkage.	Steady profitable growth for 9 years.
RQ2SEIZBOUNDARIES RQ3TRANSCOSPEC	2000	Interviews & publications.	Learning and knowledge management, Business Design, Investment Allocation, Asset orchestration.	Undertook collaborative and alliance activities.	Signed formal alliances with key industry firms including multinationals.	Multiple sources of linkages, collaborative activity.	Steady growth for the next 9 years.

RQ2SEIZDECISION	2010	Interview, observation.	Learning and knowledge management, Governance, Investment allocation, Asset orchestration.	Avoiding decision making errors.	The MD acquired a mentor and then used him to plan strategically.	Response to external threat, multiple sources of linkages and collaborative activity.	Accelerated growth.
RQ1SENSMKTR&D	2012	Interviews.	Learning and knowledge management.	Processes to identify target market segments, customer needs and innovation.	As part of the strategic plan, the firm began to hire regional and industry salespeople with experience.	Multinational enterprise, technological bases, market bases, related links, response to external threat.	Greater geographic reach.
RQ3TRANSGOV	2013	Interview	Governance, Business design, Investment allocation.	Recognising inflexion points and complementaries; a turning point occurs which changes the way of thinking and acting.	The MD restructured the business to corporatise it by bringing in a resource to do so. This changed the business in relation to governance, agency, loyalty, alignment of resources and knowledge management.	Multiple resource linkages, response to external threats, multiple sources of linkages.	Moderate growth.

Firm F – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENMKTR&D	1998-2000	Interview & firm data.	Learning and knowledge management.	Target market identified and assessing customer needs.	The business grew with growing and changing customer demands.	Multiple resource linkages; multiple sources of linkages; market bases facilitating diversification.	Steady revenue and personnel growth for 8 years.
RQ1SENSEXTR&D RQ2SEIZBOUNDARIES RQ2 SEIZLOYAL RQ3TRANCKNOWL	2006	Interview	Learning and knowledge management, Governance, Business design, Asset orchestration.	Processes to tap into external R&D. Culture of learning new processes and training implemented. Appropriability ensured.	Key technology is sourced, built and adapted for the Firm F's market. Key personnel are trained and rewarded accordingly.	Technological bases; multiple resource linkages.	Greater profitability.
RQ2SEIZLOYAL RQ3TRANSDECENTRAL RQ3TRANSGOV	2006	Interview	Governance, Business design, Investment allocation, Asset orchestration.	Recognising inflexion points and complementaries; a turning point occurs which changes the way of thinking and acting.	The new accountant brought a change in the way the MDir thought about the business processes in relation to governance, agency, loyalty, alignment of resources and knowledge management.	Multiple resource linkages.	Greater profitability.
RQ1SENSEXTR&D RQ2SEIZBOUNDARIES	2010	Interviews.	Learning and knowledge management, Business design, Asset orchestration.	The MDir sought out linkage with a university executive course.	Instilled a culture of evaluating business processes.	Multiple resource linkages; multiple sources of linkages.	Marketing to and establishing a wider customer base to create a more resilient business.

RQ2SEIZLOYAL
RQ3TRANSGOV

2012

Interviews.

Governance,
Business design,
Investment
allocation, Asset
orchestration.

Minimises agency
issues and builds
loyalty and
commitment.

The MDir included key
employees in discussing
the firm accounts and
making regular financial
decisions.

Multiple resource
linkages. Response to
external threats.

Established a larger and
more varied customer
base.

Firm G – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ2SEIZBOUNDARIES	2006	Interview.	Learning and knowledge management, Business design, Asset orchestration.	Selecting enterprise boundaries to manage complements and “control” boundaries.	Firm G (the entrepreneur) was aware that in order to grow or seize market opportunities the firm needed Health and Safety systems. The firm acquired the permanent skill sets to implement and manage these.	Response to external threat, multiple resource linkages, market bases, multiple sources of linkages, related-linked expansion, collaborative activity.	Accelerated firm growth.
RQ1SENSMKTR&D	2006	Interview.	Learning and knowledge management.	Processes to identify target market segments, changing customer needs and customer innovation.	Evidence included the new skill set brought in (the general manager) who implemented a number of processes relating to debrief meetings for lost contracts, tender formats and layouts in response to market changes.	Market bases, related linked expansion, internal influences and collaborative activity, response to external threats.	Accelerated business growth.
RQ2SEIZBOUNDARIES	2009	Interview and observation.	Learning and knowledge management, Business design, Asset orchestration.	Selecting enterprise boundaries to control platforms. Assessing appropriability.	In order for the firm to respond to the changing marketplace and control internal complexities a QA system and skillset were implemented. Diversified services were acquired to capture market opportunities.	Multiple resource linkages, market bases, related linked expansion and collaborative activity.	Accelerated business growth.

Firm H – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSSTRATR&D RQ1SENSEXTR&D RQ1SENSMKTR&D	2002	Interview, observation.	Learning and knowledge management.	Analytical systems (and individual capabilities) to learn, sense, shape and calibrate opportunities.	Strategic intent include how the firm learns internally and externally, collaborates, reviews and adopts technological innovation and has a highly developed ability to sense the market needs.	Multiple resource linkages, technological bases, market bases, multiple sources of linkages, related-linked expansion, collaborative activity.	Steady firm growth since inception.
RQ2SEIZDECISION RQ2SEIZBOUNDARIES	2002	Interview and observation.	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Selecting decision making protocols.	Important points in the firm's growth such as the link up with a multinational material supplier were recognised as such and the business changed the way it branded for instance.	Multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Steady firm growth since inception.
RQ2SEIZLOYAL	2002	Interview and publically available information.	Governance, Asset orchestration.	Building loyalty and commitment.	The firm employed permanent staff where the industry relied on contracted staff. Branding was paramount.	Internal influences, response to external threats.	Steady firm growth since inception.
RQ3TRANSDECENTRAL	2002	Interview and observation.	Governance, Business design.	Decentralisation and near decomposability.	The firm has achieved a very flexible yet strong decision making culture.	Internal influences, collaborative activity, divestment.	Steady firm growth since inception.

RQ3TRANSGOV	2002	Interview and observation.	Governance, Business design, Asset orchestration.	Governance.	Uses incentive scheme (full time employment contracts in an industry of contractors), minimises agency issues through the owners operating in the business.	Internal influences, collaborative activity, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Steady firm growth since inception.
RQ3TRANSCOSPEC RQ3TRANSKNOWL	2002	Interview and observation.	Learning and knowledge management, Investment allocation, Asset orchestration.	Co-specialisation and knowledge management.	The firm has aligned assets strategically, coordinated R&D activity. Facilitates internal knowledge transfer, evidence of internal integration of know-how.	Internal influences, collaborative activity, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity, divestment.	Steady firm growth since inception.
RQ2SEIZBUSMODEL	2008	Interview, observation.	Learning and knowledge management, Business design, investment allocation, asset orchestration.	Delineating the customer solution and the business model.	The firm's market demand began to deviate from its core competencies. Firm H spun off a subsidiary to allow it to focus on its strategic plan.	Multiple sources of linkages, market bases, related linked expansion, divestment, shifting cores, internal influences and collaborative activity.	Steady firm growth since inception.

Firm I – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ3TRANSGOV	2010	Interview, publically available data.	Governance, Business design, Asset orchestration.	Changed the governance structure incentivise senior staff and capture loyalty.	This arguably set up the firm and to an extent the flexible firm culture.	Market bases, multiple resource linkage, multiple sources of linkages, collaborative activity.	Profitability increased.
RQ3TRANSKNOWL	2010	Interview	Learning and knowledge management.	Knowledge transfer, know-how integration, control thereof.	Not only implementation of business measures (technical fitness), but the use thereof in the business to influence improvement processes.	Technological bases, multiple sources of linkages, internal influences and collaborative activity.	Profitability increased.
RQ2SEIZLOYAL	2010	Interview	Governance, Asset orchestration.	Building loyalty and commitment, demonstrating leadership, communicating, recognising non-economic factors.	Management team restructured early on, KPIs established, clear job descriptions and clear communication evident.	Internal influences and collaborative activity, multiple resource linkages.	Profitability increased.
RQ1SENSMKTR&D RQ1SEIZBOUNDARIES RQ2SEIZBOUNDARIES RQ3SEIZBOUNDARIES RQ2SEIZDECISION	2011	Interview and observation.	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Processes to identify and target market segment, changing customer needs and customer innovation.	Recognised and developed a plan to expand services into a new technological area. Invested in new technologies. Evidence of interaction with suppliers to seek out innovative possibilities.	Technological bases, market bases, multiple sources of linkages, multiple resource linkages related linked expansion,	Product offering growth.

RQ2SEIZBUSMODEL

2012

Interview,
publically
available data.

Learning and
knowledge
management,
Business design,
Investment
allocation, Asset
orchestration.

Reviewed and
redesigned
revenue
architecture.

A business in a very
competitive and
declining market
was reviewed and
sold.

Divestment.

Rapid profitable
growth.

Firm J – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSEXTR&D RQ2SEIZBUSMODEL	2007	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Acquires external innovation ahead of competition. Selecting the technology and product architecture.	This process due to active searching and network abilities allowed the firm to realise a market opportunity.	Market bases, multiple resource linkage, multiple sources of linkages, collaborative activity.	Revenue increased dramatically.

Firm K – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSETRATR&D RQ2SEIZDECISION	2009-2010	Interview	Learning and knowledge management, Governance, Investment allocation, asset orchestration.	The business marketing has included the fit with internal skills (assets).	There is an alignment of the firm's internal resources to targeted marketing.	Multiple resource linkages, related linked (geographic) expansion, response to external threats.	Greater geographic reach. Recent increased profitability.
RQ1SENSMKTR&D RQ3TRANSCOSPEC	2010-2011	Interview	Learning and knowledge management, Investment allocation, Asset orchestration.	The business has expanded marketing offshore using a variety of networks.	The focus was on seeking opportunities outside of the NZ market prior to the NZ market diminishing. The focus increased in the last 2-3 years.	Technological bases, market bases, related links, response to external threat.	Greater geographic reach.
RQ1SENSTRATR&D	2011	Interview	Learning and knowledge management.	Undertaken learning activities externally. Seeks information about what is going on in the business ecosystem.	The MD gained significant strategic insight into the business.	Multiple source of linkages; related – linked expansion and divestment.	Greater profitability.

RQ2SEIZLOYAL RQ3TRANSDECENTRAL RQ3TRANSGOV	2011	Interview & firm publications	Governance, Business design, Investment allocation, Asset orchestration.	Uses a collegial decision making process to employ staff (key asset acquisition).	There was a definite change in the way the business interviewed and hired new staff at this point from a single outside input to the whole team being included in the process.	Multiple resource linkages.	Greater profitability.
RQ2SEIZDECISION RQ3TRANSDECENTRAL RQ3TRANSKNOWL	2012	Interview	Learning and knowledge management, Governance, Business design, Investment allocation.	Employing an experienced engineer to focus on business development.	The business had identified a lack of internal process management.	Multiple resource linkages.	Greater profitability.

Firm L – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	1992	Interview	Learning and knowledge management.	Identification of target market segments, changing customer needs and innovation.	This arguably set up the firm and to an extent the flexible firm culture.	Market bases, multiple resource linkage, technological bases.	Steady firm growth for 8 years.
RQ1SENSMKTR&D RQ2SEIZBUSMODEL	2002	Interview, publically available information, observation.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Selecting target customers, designing revenue architecture and mechanisms to capture value.	Opportunity allowed the firm to expand into another geographic area, the firm then established a permanent operation to capture this opportunity.	Multiple sources of linkages, market bases, related linked expansion, multinational enterprise.	Accelerated geographic and business growth.
RQ1SESNEXTR&D RQ2SEIZBUSMODEL	2012	Interview and observation.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Acquires external innovation ahead of competition. Recognizing inflexion points and complementarities.	The firm started up a complementary business to take advantage of complementary services.	Response to external threats, related linked expansion, technological base, vertical integration.	Growth in product and service offering.
RQ2SEIZDECISION RQ2SEIZBOUNDARIES	2012	Interview	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Selecting decision making protocols. Selecting enterprise boundaries to manage complements and control platforms.	Collaborative activity with a major engineering consultancy to provide neutral intermediary between Firm L and the big oil companies. Staff embedded mutually between companies.	Internal influences and collaborative activity, response to external threats.	Moderate increase in profits.

RQ2SEIZDECISION	2013	Interview and observation.	Learning and knowledge management, Governance, Investment allocation, Asset orchestration.	Selecting decision making protocols.	Brought in external board member to review the business processes and provide independent advice.	Response to external threat, divestment.	Focus on core activities.
RQ3TRANSGOV	2013	Interview, publically available data.	Governance, Business design, Investment allocation, Asset orchestration.	Governance structure changed.	A board was assembled with a mentor included.	Response to external threat.	Moderate increase in profits.

Firm M – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D RQ2SEIZBUSMODEL	1960s	Interview & firm data.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Processes to identify target market segments, changing customer needs and customer innovation	The shareholders were able to sense that the current product offer was not profitable nor sustainable and sought about acquiring unique skill sets (resources) to change this direction.	Technological bases facilitating diversification.	Moderate revenue and profitable growth.

Firm N – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSSTRATR&D RQ1SENSEXTR&D RQ1SENSMKTR&D	1993	Interview.	Learning and knowledge management.	Analytical systems and individual capabilities to learn, sense , shape, filter and calibrate opportunities.	The partners recognised a gap in the market for a dull service and product offering. Strategic intent focused on vertical integration in the industry as a first mover and a strong service proposition. This arguably set the business up for their strong period of growth since 2002.	Multiple resource linkages, technological bases, market bases, multiple sources of linkages, related-linked expansion, collaborative activity, vertical integration.	Steady firm growth since inception.
RQ2SEIZDECISION RQ2SEIZBOUNDARIES	1993	Interview.	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Recognising inflection points and complementarities. Selecting enterprise boundaries.	The disappointment of poor service from existing machine suppliers was recognised as an opportunity to set up a business with a very different market proposition. The partners had an existing network from previous experience. Agency agreements are exclusive as a policy.	Market bases, multiple sources of linkages, collaborative activity.	Steady firm growth since inception.
RQ3TRANSDECENTRAL	1993	Interview and observation.	Governance, Business design.	Decentralisation and near decomposability.	The firm has achieved a very flexible yet strong decision making culture.	Internal influences, collaborative activity, market bases.	Steady firm growth since inception.

RQ3TRANSCOSPEC RQ3TRANSKNOWL	1993	Interview and observation.	Learning and knowledge management, Investment allocation, Asset orchestration.	Co-specialisation and knowledge management.	The firm has aligned assets strategically, coordinated R&D activity mostly with suppliers. Facilitates internal knowledge transfer, evidence of internal integration of know-how.	Internal influences, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Steady firm growth since inception.
RQ2SEIZBUSMODEL	2002	Interview, publically available information.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Delineating the customer solution and the business model.	The director responsible for selling relocated to the largest market opportunity. A 3 rd business partner and capital was introduced.	Multiple sources of linkages, market bases, internal influences.	Accelerated business growth.
RQ3TRANSGOV	2002	Interview and publically available information.	Governance, Business design, Asset orchestration.	Governance.	There is a strong history of replacing and renewing directors to suit the phase of growth. The first evidence of this is in 2002 just prior to the period of accelerated growth.	Internal influences, multiple resource linkages, response to external threats, market bases, related linked expansion.	Accelerated business growth.

Firm O – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSMKTR&D	1984	Interview	Learning and knowledge management.	Identification of target market, changing customer needs.	This arguably set up the firm and to an extent the flexible firm culture.	Technological bases, market bases.	Fast growth for 5 years.
RQ2SEIZDECISION RQ2SEIZLOYAL RQ3TRANSGOV	1989	Interview	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Changed the governance structure to offer ownership incentives to senior staff and capture loyalty.	Shareholding was altered to allow staff to buy into the business. Demand to this day has exceeded supply.	Multiple resource linkage.	Rapid profitable growth.
RQ2SEIZBOUNDARIES RQ3TRANSCOSPEC	2004	Interview & observation	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Established and regularly reviews formal business plan. Established accredited quality management system.	Established the correct processes to regularly review the appropriateness of business processes and functions.	Multiple resource linkage, multiple sources of linkages and internal influences.	Moderate revenue growth, profitability and accelerated geographic growth.
RQ1SENSMKTR&D	2011	Interview	Learning and knowledge management.	Process to identify and target market segment.	Recognised and developed a plan to expand services into a new geographic area (QLD). As opposed to 10 years prior 2 ill thought out unsuccessful attempts to expand geographically.	Multinational enterprise, technological bases, market bases, related links, response to external threat.	Geographic growth.
RQ2SEIZBOUNDARIES	2011	Interview	Learning and knowledge management, Business design, Asset orchestration.	Undertakes collaborative activities.	An opportunity was recognised with the employment of a PNG engineer with contacts. An alliance was formed with a large PNG oil firm.	Collaborative activity, related linked expansion.	Geographic growth.

Firm P – Dynamic capabilities summary table.

Code (addressing RQ)	Year implemented	Data Source	Key Management Skill	Process	Evolutionary Fitness Scale (Helfat et al, 2007)	Growth Mechanism (Penrose, 2009 (1959), Kay, 2002)	Growth Outcome
RQ1SENSSTRATR&D RQ1SENSEXTR&D RQ1SENSMKTR&D	1996	Interview, observation.	Learning and knowledge management.	Analytical systems (and individual capabilities) to learn, sense, shape and calibrate opportunities.	Strategic intent include how the firm learns internally and externally, collaborates, reviews and adopts technological innovation and has a highly developed ability to sense the market needs.	Multiple resource linkages, technological bases, market bases, multiple sources of linkages, related-linked expansion, collaborative activity.	Steady firm growth.
RQ2SEIZBUSMODEL	1996	Interview, firm information, observation.	Learning and knowledge management, Business design, Investment allocation, Asset orchestration.	Delineating the customer solution and the business model.	Since this period there are many examples such as changing the business to a “franchise” model with a transparent financial information. Specialising and branding into areas outside it’s primary market all focused on its strategic plan.	Multiple sources of linkages, market bases, related linked expansion, divestment, shifting cores, internal influences and collaborative activity, response to external threats, multinational enterprise.	Steady business growth.

RQ2SEIZDECISION RQ2SEIZBOUNDARIES	2000	Interview and observation.	Learning and knowledge management, Governance, Business design, Investment allocation, Asset orchestration.	Selecting decision making protocols. Recognising inflection points and complementarities. Structure and design of business incentivises management to seize opportunities.	Important points in the firm's growth such as the strategic intention to get into the petroleum market as a specialised complementary competency. The group head office was located at a separate location.	Multiple resource linkages, market bases, related linked expansion and collaborative activity.	Greatly increased business growth.
RQ2SEIZLOYAL	1996	Interview and publically available information.	Governance, Asset orchestration.	Building loyalty and commitment.	The firm treated branch managers as CEOs. The roles are now divisional CEOs and have autonomy of their specialist areas. Branding became paramount.	Internal influences, response to external threats.	Increased business growth.
RQ3TRANSDECENTRAL	2000	Interview and observation.	Governance, Business design,	Decentralisation and near decomposability.	The firm has achieved a very flexible yet strong decision making culture. The original partners are still actively involved.	Internal influences, collaborative activity, divestment.	Increased business growth.
RQ3TRANSGOV	2008	Interview and observation.	Governance, Business design, Asset orchestration.	Governance.	Recent evidence of modifying the board. Removed the head office from operational centres.	Internal influences, collaborative activity, multiple resource linkages, response to external threats, market bases, related linked expansion and collaborative activity.	Increased business growth.

RQ3TRANSCOSPEC
RQ3TRANSKNOWL

2002

Interview and
observation.

Learning and
knowledge
management,
Investment
allocation, Asset
orchestration.

Co-specialisation and
knowledge
management.

The firm has aligned assets
strategically, coordinated
R&D activity. Facilitates
internal knowledge
transfer, evidence of
internal integration of
know-how. For example
they insource their
specialised IT services and
are developing their own
IP in software.

Internal
influences,
collaborative
activity, multiple
resource
linkages,
response to
external threats,
market bases,
related linked
expansion and
collaborative
activity,
divestment.

Increased business
growth.

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