

# The Dissemination of Innovation Knowledge as a Driver for Building an Innovation Culture and Economic Growth in New Zealand Businesses

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A thesis submitted to fulfill the requirements for the  
degree of Master of Business of AUT University.

## Attestation of Originality

I hereby declare this research thesis to be my own work, and to the best of my knowledge, does not contain any material written or published in part or whole by any other person (except where due acknowledgement is made), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institute of higher learning.

Signature: .....

Name: David Michau

Date: June 2014

## Acknowledgements

I owe great thanks to everyone who has helped, inspired and motivated me in this research journey.

In particular, I wish to thank my thesis supervisor, Dr. Coral Ingley for assisting with my long journey to completion. I would also like to thank my friends and family who have stood by me through all of my decisions, good and bad, and for believing in the results that have emerged from the study.

A big thank you is finally to be extended out to the myriad of researchers and people that have passed before me, those from whom I have borrowed and adapted ideas, theories and views that have contributed to this thesis.

I dedicate this work to the innovators of this great country. Life and business is a complex journey, an unknown journey, one of connectivity, diversity and change. Those who are prepared to be open, connected and diverse are positioned to benefit from immense areas of growth and change. The ones that will succeed are, I believe, those who are not only ready for the unknown future, they are the ones who are prepared to create it.

## Personal Motivation and Background

No single research paper or book fully encompasses the full scope of this thesis, and as such, the study derives and integrates theories and models from research areas, including innovation management, organisational behaviour, entrepreneurship, knowledge management and resource-based, network and complexity theories.

This thesis also draws on industry case studies and official reports relating to New Zealand's innovation standards and achievements. Key reports used to inform the current state of innovation practices include *Powering Innovation* (Ministry of Business, Innovation and Education (MBIE), 2011), *Innovation in New Zealand* (Statistics New Zealand, 2011) and *Innovation Index of New Zealand* (IBM, 2013), as well as *Measuring Innovation: A New Perspective* (OECD Publishing, 2010).

This thesis illustrates a pathway forged as an extension of my Bachelors of Design degree. Upon completion of the undergraduate degree, the question of “*Where does the best design come from?*” left me pondering and led to an exploration into the origin of design. This initial exploratory investigation led into the area of innovation that is driven by a company or individual striving to achieve strategic competitive advantage.

The pursuit of a Master's Degree in Business Management is intended to complement my knowledge and skills in design and pave a new pathway towards a cross disciplinary career linking design and business. I believe the focus on the area of innovation in this study will be especially relevant to achieving these dual aims.

## Abstract/Summary:

This thesis explores a number of barriers to innovation as identified in the 2011 report by the Ministry of Business, Innovation and Education: *Powering Innovation* (MBIE, 2011.)

The two questions which guided this research were: (1) What is the current innovation culture in New Zealand businesses? And (2) how do innovative businesses drive and accelerate the transfer of key innovation knowledge and skills for growth within the business?

A review of the extant literature explored the current state of innovation and creativity in businesses as well as the levels and practices of collaborative knowledge sharing within and among businesses.

Interviews were conducted with eight participant innovative companies selected throughout Auckland, with a content analysis of the interview data.

Key results were consistent with the literature and included areas of collaboration that shows areas of potential improvement. These results included a correlation between knowledge management and IP protection with the findings being an implication of risk as a major barrier to innovation, and its effects on successful growth through innovation.

Suggestions for future research include larger cross-sectional studies encompassing multiple industries and differing types of innovative companies. This would assist in confirming the findings found in a small sample size. Other studies could involve a focus on collaboration management and risk management pertaining to innovation, particularly in smaller firms.

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## Abbreviations

AUTEC - Auckland University of Technology Ethics Committee

CRI – Crown Research Institute

GDP – Gross Domestic Product

HVM - High Value Manufacturing

IP - Intellectual Property

KM - Knowledge Management

KT - Knowledge Transfer

MBIE – Ministry of Business Innovation and Education

MSI – Ministry of Science and Innovations

OECD – Organisation for Economic and Co-operation Development

R&D - Research and Development

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## Chapter I - Introduction

This chapter introduces the background and importance of this research, first by looking briefly at the economic situation of New Zealand and how innovation is a key factor in economic growth. This chapter introduces a governmental report issued in 2011 called *Powering Innovation* (MBIE, 2011), an independent report commissioned by the then named Ministry of Science and Innovation. It goes on to focus on New Zealand's current positions in R&D and innovation, and how the government can facilitate the development and growth of these areas.

The chapter will then look briefly at a phenomenon economists call the New Zealand Paradox, an economic situation where despite all factors being in the country's favour there remains a lack of economic performance. This section concludes with a statement of the research questions for the thesis and briefly covers the limitations of the study.

### 1.1. Statement of Problem – New Zealand's Innovation Climate

New Zealand holds a unique position in the world, where a strong backbone of primary industries in agriculture and tourism has contributed greatly to the growth of New Zealand's economy to date. This strength in the primary industries provides a stable economic platform from which to grow further diverse industries and sectors focusing on innovation and research and development (R&D) with the goals of driving intellectual property (IP) creation for businesses in New Zealand (McCann, 2009.) The *Powering Innovation* report (MBIE, 2011) indicates that New Zealand has the potential to grow and evolve into a world class innovation hub.

The report also notes that investment in R&D is low by comparison on an international level, with a reported 1.3% of the total GDP being spent on R&D (MBIE, 2011) It is further noted in the report that R&D expenditure is clearly linked to GDP growth when compared to OECD data. This data confirms the correlation between increased R&D expenditure and the growth of a nation's GDP. This low expenditure contributes to the widely growing gap in science, technology and innovation, and in turn the overall economic growth for the nation.

Whilst this ministerial report focuses on the high value manufacturing and services sector, it also reports on an overall vision for a national drive towards increased innovation and development and highlights the overall barriers to innovation. Some of these barriers include:

1. Connectivity issues regarding a lack of networking and collaboration between organisations and industries
2. A lack of access to knowledge and transfer of knowledge from the R&D sector to industry, which is linked to an overall lack of experience in using R&D as well as the understanding of what R&D and its capabilities mean for an organisation

The perceived lack of need for a national innovation strategy including differences in organizational culture, challenges in and around siloed organisations, as well as challenges around relationships and management of IP.

These three points are of particular interest in this thesis as they are areas of focus identified in numerous studies and reports conducted in the past. Hendy (2013) identified the importance of innovation in diversification away from the primary industries. As early as 1991, Crocombe, Enright and Porter (1991) identified the need for New Zealand to 'upgrade its competitive advantage' in order to raise its position in the world as the prosperous first world nation it should be.

In addition to the importance of innovation knowledge and collaboration, this study has selectively narrowed down these three points to focus on the relevant topic of collaboration. This was necessary due to the size of report and the limitations imposed by the restricted time frame and resources for the completion of this study.

With this background in mind, the study focuses on developing a deeper understanding of aspects of the key issues highlighted in the ministerial report.

### **1.1.1. The New Zealand Paradox**

This section will look at the importance of innovation for New Zealand and examine New Zealand's current economic situation.

New Zealand sits in a very unique economic position. Despite being considered an advanced economy in the OECD group of member countries, its small population restricts the volume of local trade, emphasising the need for international trade for economic growth. However, the geographic proximity to key trade markets poses barriers in both in terms of time and cost factors thereby affecting New Zealand's economic growth (Hendy, 2013; McCann, 2009).

The NZ economy is commonly compared to several other nations when measuring its economic well-being. Comparative measures include population, Gross Domestic Product (GDP) per-capita, as well as other comparable measures such as relative distance from main foreign markets (Hendy, 2013; McCann, 2009).

The most notable among these comparable countries, include: Australia, Denmark, Puerto Rico, Israel, Iceland and Finland. Finland has a similar economic history to that of New Zealand, stemming from its historic strength in the primary industries, followed by diversification into technology industries which emerged in the latter half of last century.

Denmark, Finland and Puerto Rico all have similar populations and GDP to New Zealand. Israel and Iceland are of particular interest to this thesis because of their similar geographic locational challenges with regard to trade markets (Statistics New Zealand, 2011).

Table 1 shows these nations as all having similar prosperity measures to New Zealand except for Australia which is much larger in population and GDP.

Global competitiveness rankings, innovation and sophistication ranks have been included to illustrate comparativeness on selected dimensions.

*Table 1 Comparable Economic Nations - Ranked in Order of Competitiveness*

	Population (Millions)	GPD (US\$ Billions)	GDP per capita (US\$)	Global Competitiveness Ranking (Out of 148)	Innovation and sophistication Ranking	Enabling Trade Index Rank (Out of 132)
Finland	5.4	250.1	46,098	3	2	6
Denmark	5.6	313.6	56,202	15	11	3
New Zealand	4.4	167.9	38,222	18	27	5
Australia	22.3	1,540.8	67,723	21	26	17
Israel	7.8	240.9	31,296	27	8	26
Puerto Rico	3.7	101.0	27,451	30	22	-
Iceland	0.3	13.7	41,739	31	28	16

*Source: World Economic Forum, Global Competitiveness Report (2013)*

At first glance, New Zealand appears to be faring well against the selected comparable nations, and it is notable that the country climbed five places from 23rd in overall competitiveness based on a 2012 competitiveness report (2013). However, regarding the innovation and sophistication ranking, which is the main focus of this thesis, New Zealand is shown to be lacking and falls behind most comparable nations, including

Puerto Rico, which has a significantly smaller GDP. Moreover, New Zealand is ranked only one place higher than Iceland, which has a much smaller population and is rated as less competitive.

### 1.1.2. Freedom to Grow

Economic growth requires a certain level of market freedom for a country to prosper (Solow, 1956). For a nation to prosper and grow it is thought that certain favourable economic conditions are needed (Unger, 1979.) According to Mankiw (1992) Freedom to trade, property rights, fair taxation, law and order, supply of infrastructure, education and financing are among the main conditions determining economic prosperity.

In the 2012 Enabling Trade Index produced by the World Economic Forum, New Zealand ranks 5<sup>th</sup> in the world, ahead of Finland, although after Denmark. Iceland and Australia are ranked 16<sup>th</sup> and 17<sup>th</sup> respectively while Israel is ranked 28<sup>th</sup>.

Among the key indicators, New Zealand ranked: 3<sup>rd</sup> best in ethics and corruption; 7<sup>th</sup> best in government efficiency; 5<sup>th</sup> best in domestic competition; 5<sup>th</sup> best in tariff dispersion (World Economic Forum, (2012). All of these indicators represent aspects of freedom to operate. Furthermore, The World Bank (2013) mentioned New Zealand as being the easiest place in the world to start a business, and the 3<sup>rd</sup> easiest place in the world to conduct business.

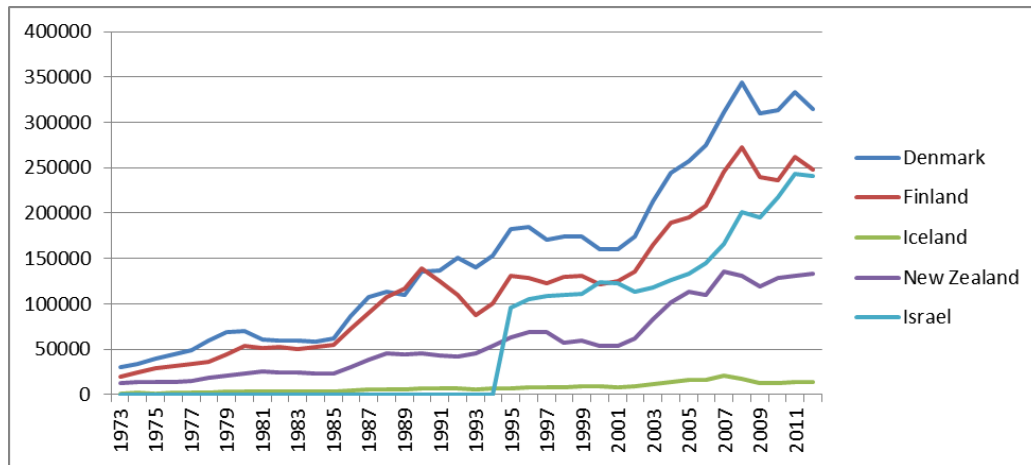
Given New Zealand's strong positions in global competitiveness, freedom to operate and freedom to trade, a discrepancy is apparent with regard to its economic performance. New Zealand consistently lags behind the average GDP for the OECD grouping and this gap is increasing year-after-year (see Figure 1.1.)

From 1973 to 1985, the difference in GDP growth between OECD nations was minimal, however since 1985 this gap has grown significantly, and with current growth rates continuing to widen. It can be seen from the figure that in the last two decades that there has been a relatively similar rate of economic growth compared to the OECD average; however, New Zealand was too slow in the growth of science and technology in the 1980's, preferring to rely on the primary industries that allowed other nations to grow at a much faster rate leaving New Zealand behind. It is generally believed that when GDP rises so does the economic prosperity of the nation. New Zealand may be growing at a current rate similar to the average OECD, however, if it does not step up and produce a higher than average growth rate, until it has at least caught up, there will always be a gap in New Zealand's prosperity and well-being (Crocombe, Enright, &



Porter, 1991; Hendy, 2013; McCann, 2009.)

*Figure 1 GDP Growth of Comparable OECD Nations*



Source: OECD Dataset Retrieved from <http://stats.oecd.org/> on 7 October 2013.

Figure one reveals that there was a time when the gap between nations was minimal, however over time this gap has grown significantly and with current growth rates, the gap continues to widen. It should be noted here that Israel's apparent inconsistent rise is due to the lack of data recorded before 1995. However, from the early 2000's it can be seen clearly that Israel has produced a growth rate that is higher than average allowing them to catch up to Finland on the GDP growth chart. This proves that a nation with a small population, geographic challenges, and low natural resources for primary industries can in fact achieve a growth rate that brings it up to international leadership in a relatively short time frame.

### 1.1.3. Summary

New Zealand is ranked relatively highly in comparison to other nations of similar population and GDP, its freedom to trade and its position as one of the easiest places in the world to conduct business. However, despite these economic advantages New Zealand still lags behind the comparative OECD nations selected for this discussion, by a significant gap, which statistical data shows continually widening. This situation therefore indicates a lower level of economic prosperity compared to the country's comparators, a contradiction which suggests economic underperformance.

In his book, *Get off the Grass: Kickstarting New Zealand's Innovation Economy*, Professor Shaun Hendy (2013) highlights the country's economic paradox which he discusses in-depth, and identifies issues relating less to geographic isolation or low

population, and more to a knowledge gap.

The reason this paradox has occurred is still a relatively unexplained phenomenon to researchers and economists; however, one reason that is constantly discussed is New Zealand's reliance on its primary industries. Hendy (2013) clearly states this in his latest work while it was also hinted to over 20 years ago by Porter (1991.)

## 1.2. Research Questions

Based on the preceding discussion, the following questions emerge: What is the current innovation culture in New Zealand businesses? More particularly, how do innovative businesses drive and accelerate the transfer of key innovation knowledge and skills for growth within the business?

The first question explores the recent ideas and research around creativity, assigning creativity as a key driver of innovation and management practices throughout small to medium enterprises (SMEs), and exploring the level of creative intelligence as a whole in New Zealand firms.

The second question indicates an examination of the dissemination of innovation knowledge throughout New Zealand businesses, assessing areas of networking and collaboration as drivers of knowledge flow.

These two questions are related to each other by way of knowledge creation. Although, creativity can be seen as a skill set, the underlying skill emerges from awareness of being creative, which will be covered in the following literature review. One goal of this thesis is to confirm that creativity is an important underlying notion of innovation knowledge, and by extension, economic growth.

If New Zealand is to prosper in the future and return to its competitive position relative to its OECD counterparts it must take innovation and R&D seriously. The *Powering Innovation* report (MBIE, 2011) is the latest to analyse and outline several areas of improvement for New Zealand's governments and businesses to embrace and implement. Without diversification away from the long held reliance on the primary industries, and without increasing the productivity of business output, New Zealand will continue to lag behind and even fail to be prosperous in the future (Hendy, 2013; McCann, 2009; Raine, Teicher, & Reilly, 2011).

Hendy's (2013) identified knowledge gap and Porter's (1991) recommended productivity improvements provide a strong background focus for this thesis. Furthermore, when assessing collaborative innovation practices, both Chesbrough

(2007) and Von Hippel (2007) state that future studies are needed in the principles and processes of community-managed governance as well as the practical applications of open innovation practices. Von Hippel (2007) also identifies the need to explore the “nature and functioning” of open innovation communities.

These issues coupled with the recent *Powering Innovation* (MBIE, 2011) report’s identified areas of collaboration, knowledge transfer and innovation strategy, as well as organisational culture and this study will set out to address these aspects more closely in the context of New Zealand businesses. The study aims to uncover day-to-day challenges businesses face when managing knowledge transfer. Some differing views may emerge from common practices in intellectual property (IP) protection and collaboration, and potentially give insight as to why the above issues have been identified throughout numerous reports and studies. By assessing how firms undergo knowledge requisition or transfer, and identifying what the challenges are that these firms are facing, this thesis attempts to provide a base knowledge to deduct and develop frameworks, practices and strategies for driving innovation and collaboration throughout New Zealand businesses.

### 1.3. Limitations/Scope

This thesis focuses on areas of knowledge sharing and dissemination as actively practiced by the firms interviewed, as well as the caliber of, and types of organisations these companies are collaborating with in order to gain insight into the effectiveness of these partnerships. While this thesis will touch on organisational culture from which innovation is stimulated, the potential value of this construct as a measurement is recognised, although lies outside the scope of this work.

Whilst, the results of this study can be applied to all companies in all sectors, the focus of this study is on SMEs in the high value manufacturing (HVM) sector, predominantly operating in Auckland, New Zealand’s largest City. Reasons for why the HVM sector was chosen are covered in depth in chapter three.

The leading reason for these limitations are the previously mentioned need for diversification away from the primary industries, and as a consequence, a shift in focus to the HVM sector as this sector allows a higher level of productivity output that is needed to boost New Zealand’s GDP.

Theoretical perspectives that are drawn upon in the following literature review are those of organisational culture, the resource based theories, and knowledge based theories as well as network theory. Complexity theory is also explored as it ties all of the

theories together.

#### **1.4. Structure of the Thesis**

The following sets out the structure of the remainder of the thesis.

Chapter 2 reviews extant literature from four main schools of thought: creative destruction and resource-based theory, knowledge-based theory, and network theory. The chapter concludes with a brief review of complexity theory as a connecting perspective. Based on these perspectives a conceptual framework is developed as a theoretical grounding for the study.

The structural objectives and methodological framework for this research are set out in Chapter 3 which also addresses ethical considerations, followed by details regarding data collection and analysis. The chapter concludes with a section on data validity and limitations of the study.

The findings of the primary research are based on interviews conducted with eight case companies that are presented in Chapter 4.

The thesis concludes in Chapter 5 with a discussion of the findings in relation to the extant literature reviewed in Chapter 2, and the conceptual model derived from this review. In summarising and concluding the overall study the conceptual model is refined, and contributions to theory and practice are explicated. The chapter closes with a discussion of the limitations of the study followed by suggested directions for future research.

## Chapter 2 - Literature Review

This chapter reviews and critiques theories and empirical research that ground this study by way of a literature review. This literature review covers four main areas of interest, these all being academic theories that inform the underlying ideas of creative destruction and sustained competitive advantage. These four areas are resource-based theory, knowledge-based theory, network theory, and complexity-theory.

Resource-based theory is explored for its focus on the necessary elements for innovation to take place. Knowledge-based theory, while a sub-set of resource-based theory, is considered for the overall relevance and previously identified importance in the *Powering Innovation* Report (MBIE, 2011.)

Network theory addresses collaboration and open innovation, which are also key drivers identified in the report, and are necessary elements for the dissemination of knowledge.

These theories together indicate the relationships involved in creating an environment for building a sustained competitive advantage.

Finally, this literature review briefly explores complexity theory for its future orientation and it's modelling of how companies can be better prepared for the unknown.

### 2.1. Creative Destruction and Resource Based Theory

This section considers the importance of innovation through the lens of the resource-based theory.

Innovation is widely-known to be a core driver in the economic growth of companies and countries. It is increasingly the focus of company directors and CEOs worldwide, and is widely recognised as the lifeblood of corporate growth and survival (Zahra & Covin, 1994.)

Question 1 of the research questions asks "*What is the current innovation culture in New Zealand businesses*". The [question] is further defined as: "how do innovative businesses drive and accelerate the transfer of key innovation knowledge and skills for growth within the business?" This section goes on to define what an innovative culture is and how it could be identified and utilised in pursuing innovation and competitive advantage.

### 2.1.1. Creative Destruction

In his seminal work, Joseph Schumpeter (1942) illustrated innovation with the term 'creative destruction', a term he adopted from early Marxist theory. Creative destruction refers to industries which constantly innovate by 'destroying' that which is old and replacing it with something new, effectively making the old technology obsolete. Furthermore, Schumpeter places emphasis on this process as being a central notion of capitalism.

It is important to recognise the theory of creative destruction to gain a full understanding of innovation and the resources required to make it happen.

Creative destruction is not always good, however, as it can create economic hardships with destructive actions often resulting in companies shutting down with job losses and related problems. An example can be seen in the photography industry in moving from film to digital imaging, resulting in the creation of new companies and the destruction of the old and obsolete. Creative destruction is disruptive, in this sense.

Although the short term implications of creative destruction can be viewed as damaging, it is generally agreed that it is a desirable outcome in the long term, producing long term progress that is more beneficial so as to outweigh the short term losses (Christensen, 2011; Schumpeter, 1942).

### 2.1.2. Competitive Advantage and Porters 5 Forces

Competitive advantage is a theory originated by Michael Porter in 1985. It is a view in economics where a company, industry or nation differentiates itself by way of an attribute such as a resource or knowledge that its competitors do not have, thus developing a competitive advantage.

Porter furthered his theory by developing the five forces framework (Porter, 1985.) This framework illustrates five attributes where companies can gain a competitive advantage. These forces are: threats of new entrants; threats of substitutes; bargaining power of customers; bargaining power of suppliers and intensity of rivalry, indicating that a company cannot successfully thrive if operating simultaneously with competitors in the same market. Striving for these differentiators are in effect actions towards creating innovations. If an innovation successfully controls these five forces, the firm could be said to hold a competitive advantage and be better positioned to contribute to or initiate creative destruction.

## 2.2. Part One - Resource Based Theory

Resource-based theory can be seen as the underlying theory behind Porters Five Forces, sharing similar attributes relating to the collective process of creative destruction.

The resource based view of a firm's competitive advantage states four key points of focus of a firm's key resources: 1) the resource must be valuable; 2) the resource must be rare; 3) it must be inimitable, or difficult to copy; and finally 4) it must be non-substitutable, or unique and unable to be substituted with another comparable solution (Busenitz, 2001; Barney, 1991.) When all of these four characteristics are present in a resource, it is said to hold valuable competitive advantage. Furthermore, when these four characteristics are true for an innovation, it holds a great degree of competitive advantage and the potential for the innovation to be highly successful.

### 2.2.1. Defining Innovation

Over the decades there have been many definitions of innovation. These definitions are somewhat akin to the values of each organisation utilising innovation practices in the first place, and every organisation has its own goals and roadmaps.

It is generally accepted and agreed upon that innovation is the creation of something new, adding value to a product, service or process. (Baregheh, Rowley, & Sambrook, 2009; Christensen, 2011; Eric von Hippel, 1994.) However, while the definition of innovation can be made simple and clear, innovation as a whole is a complex topic, being both multidimensional and multidisciplinary (Baregheh, Rowley, & Sambrook, 2009). In order to explore innovation practices in-depth, for the purposes of this thesis, it is important to have a workable definition of innovation.

Perhaps the best appointed definition comes from a study conducted in 2009 which explored the vast and different definitions of innovation, a content analysis of 60 different innovation definitions from various disciplines resulted in six defining attributes; Nature of Innovation, Type of Innovation, Stages of Innovation, Social Context, Means of Innovation and Aim of Innovation (Baregheh et al., 2009.) This analysis resulted in a comprehensive definition. Stated as:

*“Innovation is the multi-stage process whereby organisations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace”* (Baregheh et al., 2009.)

The authors state further that their definition should “assist in crossing disciplinary

boundaries, and act as a basis for more transparent sharing and transfer of knowledge relating to innovation and its processes.” (Baregheh et al., 2009)

The definition gives an explanation of innovation as a complex undertaking in a business environment. It does not single out innovation as a process for only one product or service but rather encompasses all “new/improved products, services or processes.” Most importantly, this definition indicates why innovation is important for business stating “in order to advance, compete and differentiate” from other businesses, acknowledging that the reason for innovation in the first place is in pursuit of identifying and obtaining competitive advantage (Porter, 2008.)

The next section explores and specifies various dimensions of innovation.

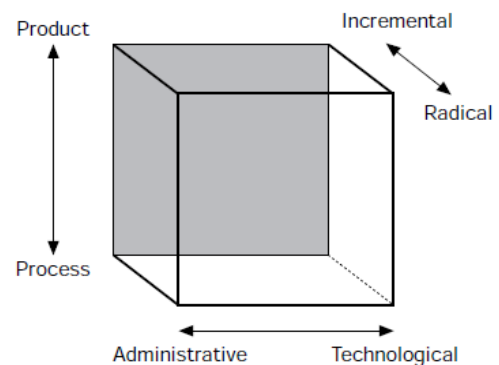
### 2.2.2. Dimensions of Innovation

Cooper (1998) points out that the adoption of innovation is a multidimensional path, identifying six areas of innovation, and appointing three succinct dimensions to it: product vs. process, incremental vs. radical, and administrative vs. technological. Cooper identified these dimensions as work in a scaling manner, which are inversely proportional to each other, e.g., the more incremental an innovation is, the less radical it becomes, and the more process driven it is the less product focused it becomes. Cooper further pointed out that the relationships between these three dimensions are interlinked, with one scale having a direct effect on all other scales. (See Figure 2.)

Figure 2 shows the six areas of innovation in a 3D cubic arrangement. All dimensions are interdependent: as one innovation dimension changes, so do the two other dimensions.

This model of innovation dimensions suggests that no innovation is simply a single dimensional advancement, and that all adjacent dimensions should be taken into account throughout the process. Such interlinked dimensionality presents a level of complexity that may not be a part of a

manager’s consideration when involved in innovation practice. Consequently perhaps a simplified version of the model, with fewer variables could be explored in future studies for the purpose of more practical managerial applications



*Figure 2 Dimensions of Innovation  
(Cooper, 1998)*



### 2.2.3. Sources of Innovation

With an organisation's need to innovate in order to maintain sustainable competitive advantage it would be important to identify which of the sources of innovation are valuable resources for the firm.

Two distinct and fundamental sources of innovation are identified in the literature. These are: internal and external innovation (Chesbrough & Appleyard, 2007; Eric von Hippel, 1994.) Both internal and external sources include several sources of innovation each. Internal innovation may come from the companies R&D department, or from an ideas program, or collaboration between internal departments within the organisation. External innovation is an idea or innovation that is sourced from outside of the company. The sources of such innovation might be stakeholders such as suppliers or customers, for example. Open innovation is ideas and innovation obtained from anyone, anywhere, from within the organisation in the case of internal sources, or outside of the organisation, in the case of external sources.

While there are many other sources of innovation such as advanced manufacturing technology, mergers and acquisitions and serendipity, to name but a few, these are not the focus in this study. This thesis concentrates on two specific sources: creative intelligence and diffusions of knowledge, which can be sourced from both internal and external sources. Further description of creative intelligence follows in the next section.

### 2.3. Part Two - Knowledge Based Theory

This section will introduce knowledge as a resource for competitive advantage and explain the importance of knowledge dissemination. The *Powering Innovation* (MBIE, 2011) report identified access to knowledge and transfer of knowledge to be a core barrier to innovation in New Zealand. For the purpose of this study it is necessary to identify knowledge as a resource and why it is important.

The knowledge transfer empirical literature is largely based on case studies within a business or sector. Pervaiz (1998), and Boschma and Walter (2007) provide studies that focus specifically on the organisation culture and its influence on the transfer of innovation. Ngah and Jusoff (2009) and Asproth and Nystrom (2008) adopt a more generic approach to knowledge transfer and dissemination without regard to a specific industry or sector.

Creative intelligence and design thinking are central concepts in an organisation's innovation capabilities. The concepts refer to the ability of individuals to think in

divergent ways, and pursue multiple approaches to problem solving. This ability contributes to building an innovation culture which is considered important to a firm's differentiation and competitive advantage (Brown, 2008.)

Brown (2008) and Burton (2009) provided conceptual literature on design thinking and creative intelligence, respectively. However, whilst design thinking is an important concept within a strategy for driving innovation, it has still not yet reached the stage of maturity at an organisational level and the literature stops short of providing guidance on in-depth techniques for its implementation.

### **2.3.1. Defining Knowledge**

Knowledge based theory is widely considered to be the most important element in the resource based view of companies (Grant, 2013.) It is the individuals who hold the knowledge and the companies role is to apply the employees pool of knowledge to benefit the company (Grant, 2013.) The nature of knowledge however, is diverse, generally difficult to replicate and complex (Dasgupta & David, 1994) and in turn, the complex nature of knowledge itself leads toward the competitive advantage of the firm (Barney, 1991) and as such, whilst the firm is in the business of applying an employee's knowledge, it is in their best interest to be continuously creating knowledge for it is the creation of knowledge that is instrumental in basic acts of innovation when pursuing competitive advantage.

Knowledge is classified into two distinct forms, tacit and explicit (Dasgupta and David, 1994; Grant, 2013). Explicit knowledge is held in conscious thought and is straightforward and easy to record. Tacit knowledge on the other hand is identified as knowledge that a person is not necessarily consciously aware of and is generally difficult to record (Snowden, 2003).

### **2.3.2. Knowledge as a Competitive Advantage**

Knowledge is commonly seen as a competitive advantage; however, Dasgupta and David (1994), argued that once tacit knowledge is recorded it no longer holds an advantage because it can be copied or imitated. This leads to implications for a firm's willingness to measure, record and codify creativity and innovation and translate them into forms of explicit knowledge, such as patents and other documents. The complex and high cost nature of innovation and R&D may lead companies to become over-protective of any IP idea, or developments or innovations, and unwilling or afraid to share their knowledge with others for fear of losing their advantage. This situation can

in turn lead to a lack of knowledge sharing, thereby restricting opportunities for general dissemination of innovation knowledge and skills, either internally within the firm or with potential collaborators.

### 2.3.3. Creativity

This section discusses creativity, what it is and why it is important for companies to understand and embrace it in order to promote innovation. The section goes on to examine the ideas of where creativity comes from, and concludes with explaining how creativity is considered to be the underlying skill of innovation, and by extension, a central notion of economic growth.

Creativity is central to the creation of knowledge for the purpose of competitive advantage and is the core enabler of innovation (George, 2007.) Creative environments are found to have positive impacts on organisational performance (Ekvall, 1996; Isaksen & Ekvall, 2010)(Ekvall, 1996; Isaksen & Ekvall, 2010.) and thus create a setting that is conducive to the creation of knowledge.

Creativity by definition is the ability create; more specifically, it is the ability to produce something new, or add value to something that already exists (Nussbaum, 2013; Ken Robinson, 2001; Woodman, Sawyer, & Griffin, 1993.) What is created could be almost anything, tangible or intangible, an idea, a process, a product, a painting, a musical score or movie script, an invention, a community, a situation, and so on.

Robinson (2001) is careful to distinguish the difference between the tacit and explicit relations of creativity. Simply thinking creatively, according to Robinson, is purely imagination, whereas to produce something creative is to apply tacit thoughts to something explicit, be it writing down an idea or producing a feature length movie - making the intangible idea a tangible reality.

Often commented on alongside creativity is the notion of originality; however, creativity is not an individualistic practice, it is attained from a relationship with something... be it another person, or piece of research, songs, film, or experience. In a way, it is connecting the dots between two separate incidents (Burt, 2004.) This connection is a form of networking and collaboration between individuals, which will be explored further in a following section.

An often misconceived belief is that creativity is a skill people are born with, that you either have it or you do not. (Robinson, 2001.) Also, a common misconception is that creativity is a skill set reserved only for those involved in the arts, and those in the sciences believe it is an unnecessary tool. So it is that scientists tend to be thought of, by

the general public, and themselves as being non creative people. However, Robinson (2001) argues and validates this to be untrue, that as children human beings are all creative and have imaginations and it is an ability which is often lost through the current day education system. If creativity is identified as a source of innovation (Cooper, 1998; von Hippel, 1994) in companies, then managers should be encouraging and building a culture of creativity as a core resource for competitive advantage (Barney, 1991.)

In his book, *Creative Intelligence*, (2013) Naussabaum presented a strong argument that creativity is in fact the core driver of economic growth, over the commonly believed notion of innovation. He provides a clear roadmap for “building new economics of creativity” (pg. 241.) Nussbaum identified creativity as the source of economic value, and thus, more importantly, promoted creativity knowledge as the core competence of innovation. He stated that “It's one thing to get together and talk about innovation, but you need scientific knowledge and equipment to actually make anything happen” (Nussbaum, 2013. p144.)

The *Powering Innovation* (MBIE, 2011) report states the need for more innovative behaviour of firms, in particular, of knowledge creation and transfer. The literature on innovation clearly identifies creativity as a core driver of innovation, yet the report fails to identify or mention creativity past the identification of business sectors, i.e. the creative industries. This suggests a misunderstanding of the role of creativity in the pursuit of innovation, both in the governmental reports findings and within the businesses conducting innovation practices.

#### 2.3.4. Motivations for transfer of knowledge (demand)

Question two in this research thesis asks “How do innovative companies drive and accelerate the transfer of innovation knowledge and skills for growth within the business?” As discussed in chapter 1 the *Powering Innovation* report (MBIE, 2011) states a 'lack of connectivity' and 'knowledge transfer as a core barrier to innovation in New Zealand companies.'

Previously, this study looked at how knowledge is one of the most valuable resources for companies in gaining a competitive advantage. Literature on knowledge transfer says that knowledge transfer is found to contribute to the competitive advantage in manufacturing firms (Argote & Ingram, 2000), by providing companies with knowledge needed to sustain a competitive advantage. It could be said that if companies start sharing their knowledge within their organisations, they could transfer

more resources for developing knowledge as well as building upon their competitive advantage.

Furthermore, if companies take a macro view of this and begin sharing more throughout their related industries or even across industries, then the knowledge could be spread farther, thus helping to close the knowledge gap and lack of knowledge transfer in New Zealand (Hendy, 2013; McCann, 2009.)

If knowledge is viewed as a core driver of innovation the benefits of knowledge sharing can be immediately seen. However, as Dasgupta and David (1994) mentioned, once knowledge is codified and recorded, it no longer holds a competitive advantage. Companies identify this and are not willing to share knowledge. Thus emerges a clash of ideals – a paradox as mentioned earlier.

### 2.3.5. Organisational Culture (Behavior)

This section describes the importance of having an innovative organisational culture within companies. Organisational culture is most often viewed as an asset when looking at this aspect from the perspective of the resource based view of the company; however, it is also addressed within network theory as a precursor to Burt's (2007) Social Capital and the Spread of Ideas.

There are many methods and processes studied, developed and available for implementing and undertaking innovation in every kind of organisation. However, if the organisation itself is not open to or versed in innovative activity it can be difficult to impossible for innovation to take place in any form. The importance of organisational culture pertaining to innovation is an important avenue that has been studied throughout the last few decades (Ahmed, 1998; Damanpour, 1991; Uzkurt, 2013.)

In this literature, innovation culture can be described by first looking at organisational culture which, in itself, is described as deeply held beliefs and values of human behaviour and interaction (Ahmed, 1998.) By describing a pattern of human beliefs and values as being innovative, we begin to see a specific creative, entrepreneurial element in the way people interact and relate. It is desirable for businesses to develop this culture of innovation, as the results can begin to trickle through the business with improved ideas, products and business practices.

One specific example which Ahmed (1998) identifies is the ease of implementation of innovative strategies and plans by senior management when there is an overall innovation culture.

For an organisation to be innovative it requires a culture that leads and guides its employees to strive for innovation and drive an overall climate that makes innovation possible (Ahmed, 1998.) Martins and Terblanche (2003) indicates a number of factors needed to create a sustainable innovative culture: external environment; reaction to critical incidents; manager's beliefs and values; organisational structure and technology and resources.

Furthermore, they explore the influence of organisational culture on innovation and creativity first identifying several dimensions of culture: Mission and vision; External environment; Means to achieve objectives; Image of the organisation; Management processes; Employees needs and objectives; Interpersonal Relationships and Leadership respectively. These dimensions encompass all important areas of an organisation where the culture has an important influence on the creativity and therefore innovative effectiveness of the organisation (Martins & Terblanche, 2003.) They simplify the differences between creativity and innovation by stating that creativity is the idea generating process, and innovation is the implementation of creativity.

Damanpour, (1991) identified the association between organisation's variables versus innovativeness which are indistinguishable by types of innovations and, instead, by the type of organisation and the scope of innovations. He further suggests that future studies need to incorporate innovation related to their entire organisation rather than concentrated divisions or departments within their organisation.

The idea of an innovation culture is at the heart of the second research question, this idea leads to the next section of connecting people and ideas through collaboration and synthesising knowledge - or "joining the dots".

## 2.4. Part Three - Network Theory

With regard to the second research question, this section reviews network theory to address the connectivity issues regarding lack of collaboration and networking, as identified in Chapter 1 in the *Powering Innovation* (MBIE, 2011) report.

Network theory combines aspects of the firm, its partners and resources, with its internal characteristics, the firm's ability to engage in collaboration, to learn and create value through its partnerships (Alvarez, Busenitz, 2001.)

There are three identified areas of attention: influence of a firm's co-operative relationship on its competitive advantage and performance; form in an organisation that these inter-firm relationships take; and the companies' informal channels and

lateral connections for getting things done. How can companies' best utilise their network of partnerships to gain competitive advantage? To answer this there are two points to consider: a need to understand a firm's position in its network, and a need to understand the nature of these partnerships.

A firm's position can be identified in two ways through vertical and horizontal partnerships. In a vertical partnership, companies specialise in different stages of the same value chain. This creates opportunities for backward or forward integration of ideas and innovations as well as access to new or different markets. In a horizontal partnership, companies co-operate with competitors, suppliers and similar stakeholders in order to gain access to complementary technology and innovations.

#### 2.4.1. Social Capital and the Spread of Ideas

In his book, *Brokerage and Closure* (2007), Burt identifies idea generation as occurring only when one person transfers knowledge from one medium to another, or by that person connecting knowledge from across two or more mediums. In his (2004) article Burt defines his ideas of structural holes which he identifies as the gaps in a social structure, that when 'bridged' or connected up by one party, or 'broker', have the potential for creating new ideas, thus the potential for producing competitive advantage. Brokerage, in Burt's work, is the party, or 'broker' that created value by connecting the points in social capital, and closure is realised when parties are working closely together, providing stability and minimising risk through trust and cohesion.

Ultimately applying this value gained by commercialising the idea is, by definition, innovation and can, in turn, lead to a competitive advantage.

Burt sums it up with:

*“People with connections across structural holes have early access to diverse, often contradictory, information and interpretations which give them a competitive advantage in seeing and developing good ideas. People connected to groups beyond their own can expect to find themselves delivering valuable ideas, seemingly gifted with creativity” (p.388).*

Simply put, those well connected to other creative people are more prepared to discover ideas with the potential for gaining competitive advantage. In agreement with Robinson (2001) those persons who seem to have the 'gift' of creativity, are, according to Burt, simply very well connected to networks further afield than are their immediate colleagues.

To further his argument, Burt states that the value of an idea lies not in the idea itself, nor the idea's producer, but in the value gained from that to which the idea is applied (p63), which, by definition, is an element of innovation.

Furthermore, in his book, *The Innovators Dilemma*, (2011) Christensen discusses the importance of the value network within an organisation, stating that:

“Because an organisation's structure and how its groups work together may have been established to facilitate the design of its dominant product, the direction of causality may ultimately reverse itself; the organisation's structure and the way its groups learn to work together can then affect the way it can and cannot design new products.” (p34). In this context ‘design new products’ could mean innovation of any sort: product, service or process.

By analysing the spread and flow of ideas and as being a part of collective social capital, we can begin to understand where the source of creativity comes from, making the connections between two people, ideas or media through collaboration, resulting in new ideas, solutions and innovations.

In order to achieve economic growth through competitive advantage, the setting or culture for the facilitation of the flow of ideas must be put in place. The central idea from the literature is that collaboration must occur throughout all areas of the business, and the further the reach, the better the chances for a successful innovation culture to develop.

If networking and collaboration is so important for a firm's competitive strategic advantage, how can we facilitate this far strung networking practice throughout the company? This issue is addressed in the next section.

#### **2.4.2. Open Innovation**

A recent development in collaboration research is open innovation, a practice where companies extend their pool of ideas from internally within the organisation, its partners or collaborators, to a wider scope of external sources, such as customers, suppliers, universities and even competitors (Chesbrough & Appleyard, 2007) as a method of collaboration in pursuit of innovation.

Research on the management and governance of open innovation states that collaboration plays a key role in the development of an innovation culture although is more relevant to decentralising and dispersing the role of innovation. Of the literature on open innovation management, O'Mahony (2007) and Chesbrough (2004) offer key



concepts which they present in decentralised, community-managed governance models to facilitate innovation. Von Hippel (2005, 2007) provides a substantial overview of the current environment of open innovation supported by industry examples and empirical research. One finding was common cases where innovation was undertaken “by and for users” followed by freely sharing its proprietary information among their respective networks as opposed to the more traditional route of hiding or protecting it. This resulted in higher levels of satisfaction and welfare when problems were solved or new solutions found as a result of ‘borrowing’ and building upon existing knowledge to create solutions what are more specific to their problem (2007.)

In their overviews, both Chesbrough and Von Hippel state that future studies are needed in the principles and processes of community-managed governance as well as the practical applications of open innovation practices. In addition, Von Hippel has identified the need to explore the “nature and functioning” of innovation communities (2007). This thesis is a response to this call.

Through a core understanding provided by network theory and collaborative frameworks, open innovation can be seen as being potentially an unlimited source of new innovation for companies by way of sourcing ideas and technologies from external stakeholders such as customers or suppliers.

Open innovation is therefore an important and potentially valuable source of innovation, and it is important for organisations to identify it as a valid resource. According to this stream of literature covering open innovation, it is well stated that organisations need to learn how to harness the power of this little utilised resource, if they are to build successfully a sustainable competitive advantage (Chesbrough & Appleyard, 2007; von Hippel, 1994.)

### 2.4.3. Network Theory Summary

Part three of this literature review identified network theory as a key factor in collaboration practices. In order to gain an understanding of collaborative theories of creative destruction, three core areas were identified: organisational culture, social capital, and open innovation. Organisational culture identified the internal culture of innovation as a core enabler of innovation. Burt’s thinking on social capital and the spread of ideas was core to the practice of collaboration, focusing on strong and weak ties of collaborative connection for the spread of ideas. Lastly, this section provided a brief overview of open innovation, a relatively new concept and potential source of innovation.

For the purpose of this study, competitive advantage occurs as all three of these factors are integrated into the management practice of the organisation in pursuing innovation. This provides the basis for the conceptual study and leads to the theoretical model in part five of this review.

## 2.5. Part Four – Complexity Theory

Part four of the literature review briefly looks at complexity theory and its relevance to the research framework as an element that lies at the intersection of the three previously examined perspectives in this thesis.

Complexity theory states that the world is complex and uncertain in nature (Boulton and Allen, 2007) and, in the context of organisational studies, examines how businesses adapt to their environments. This is particularly relevant to innovation where companies are competing in a constantly changing world and continuously innovating to keep up with, or initiate change.

There are several key principles of complexity theory; however, for the purpose of simplicity the study will focus on four of these principles. These four principles were selected because they closely relate to innovation and competitive destruction, as focused on in this study.

These four key principles are:

- *There are numerous possible futures: the future is unknown and therefore unpredictable.*
- *The tipping point: where companies, ideas or systems 'tip' into new, previously unknown forms or states.*
- *The need for interconnectivity: organisations need connectivity and diversity in order to respond to changing environments.*
- *Variation as a prerequisite for novelty: innovation and change happen at the intersection of interaction and events that occur at unpredictable times. This means that for creativity to occur, the right environment for it to occur must be present.*

All of these principles are important for the space of innovation and knowledge management, because when true innovation is taking place, the desired results are new and have never before been addressed. Therefore, companies cannot take an approach of analysing the past to predict the future, there is always an unknown element

(Boulton and Allen, 2007.)

By taking a holistic, integrative view of these factors and understanding this complex set of principles, companies have the potential to better prepare themselves for a future of innovation because they:

- a. Operate their business in a state of readiness. That is, a conscious level of daily operations that is conducive to innovation, collaboration and knowledge sharing.
- b. Are prepared for what the unknown future has in store for their industry or environment, and are ready to 'tip' into other or new forms to capitalise on company evolution or growth (Boulton and Allen, 2007.)

A commonly thought conclusion to this assumption may be along the lines of “If we can measure and study how we got to where we are, we might be able to better understand what the future may hold, and thus prepare for the future and changing environment”.

Complexity theory quite plainly states that the future is unknown; therefore, we cannot plan for it. However, a more profound conclusion lies in the bold, but equally achievable potential for companies to study and understand their place on the value chain and through the use of knowledge and innovation, create and drive the future of their industry.

## **2.6. Literature Review Summary**

This literature review has covered four main areas that make up the construct for this thesis to address innovation in New Zealand: resource based theory and knowledge based theory, network theory and complexity theory.

A solid basis of extant research exists to support the value in addressing the research question to build further understanding of the topic, the need for which is clearly indicated from the findings of the ministerial report.

The next chapter will address the methodology adopted to conduct the primary research for this study.

## **2.7. Part 5 - Literature Review Theoretical Model**

The preceding sections in this chapter reviewed three main theories; resource, knowledge and network theories, which provide grounding for this study. This study utilised these three theories as lenses for constructing an integrated conceptual framework for discovering what drives innovative culture and collaboration within

businesses.

Both network and knowledge theories are viewed as important explanations of the kinds of resources associated with innovation (Ahuja, 2000.) Viewed separately, each theory can be identified in an organisation as a source of competitive advantage; yet, when all three theories are combined it can be theorised that the organisation could understand how to reach increased levels of innovation to achieve creative destruction.

A theoretical framework has been constructed to illustrate the research concept. This is seen in Figure 4.

There is no single unifying theory describing innovation; however for this study a theoretical model has been constructed based on the literature to represent key perspectives that describe innovation.

This model proposes that the three theories, resource-based, knowledge-based and network theories as summarised from the review of literature can explain contributing and underlying factors of creative destruction.

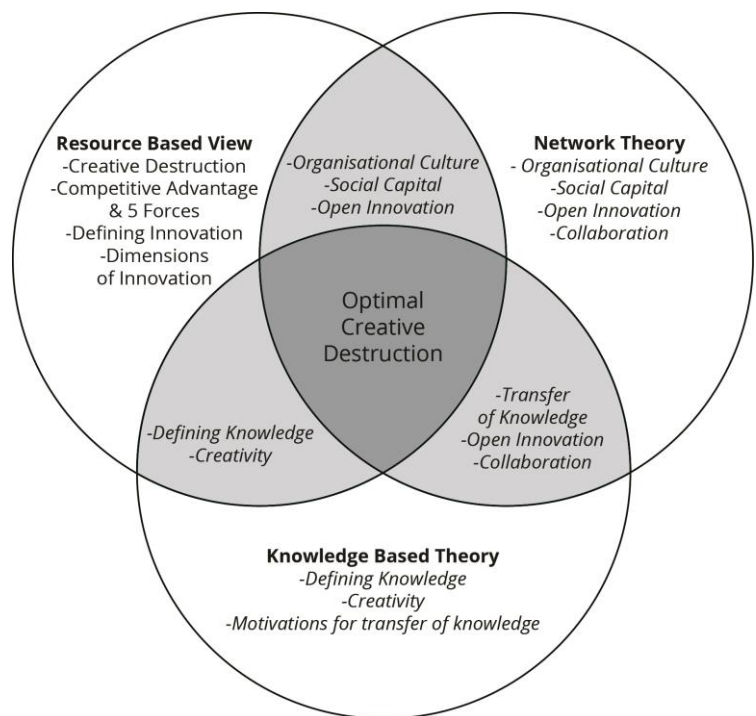


Figure 3 Theoretical Conceptual Model

Resource based theory incorporates creative destruction, competitive advantage, definitions and dimensions of innovation. Network theory focuses on organisational culture (Martins & Terblanche, 2003), social capital (Burt, 2004), open innovation and collaboration (Ahuja, 2000) while Knowledge based theory includes knowledge which defines creativity as a resource (George, 2007) and identifies motivations for the transfer of knowledge (Argote & Ingram, 2000.)

Successful innovation, identified as creative destruction by Schumpeter (1942), stems from an integrative combination of the three theories which highlight effective management of the company's resources, an in-depth understanding of knowledge

transfer as well as benefits of collaboration through networks and open innovation practices. These three facilitators of innovation all combine in an integrative management model for understanding the basis for successfully obtaining a competitive advantage through creative destruction.

Furthermore, the model suggests that when two theories are viewed in an integrative way, there are intersections between the two theories identifying the overlap in several elements of each theory. For example between the resource based view and network theory lays organisational culture, an area of literature that bridges both theories. These intersections provide the basis of concepts from the literature that this study focuses on.

The model is a simplification of a complex integrative system of innovation which will be outlined in the next section on complexity theory.

### 2.7.1. Complexity Theory: A Theoretical Model

Similar to the previously illustrated Creative Destruction model (Figure 2), complexity theory applies to all three theories mentioned thus far, and can be viewed as an integrative perspective encompassing all three theories, resource-based, knowledge based, and network theory.

Figure 5 shows complexity theory to be a central principle, linking each of the other three theories to present a more complete picture of innovation culture in an organisation. Figure 3 shows an intersection between these three theories combined such a way that complexity theory becomes a central theme that can be applied to innovation management.

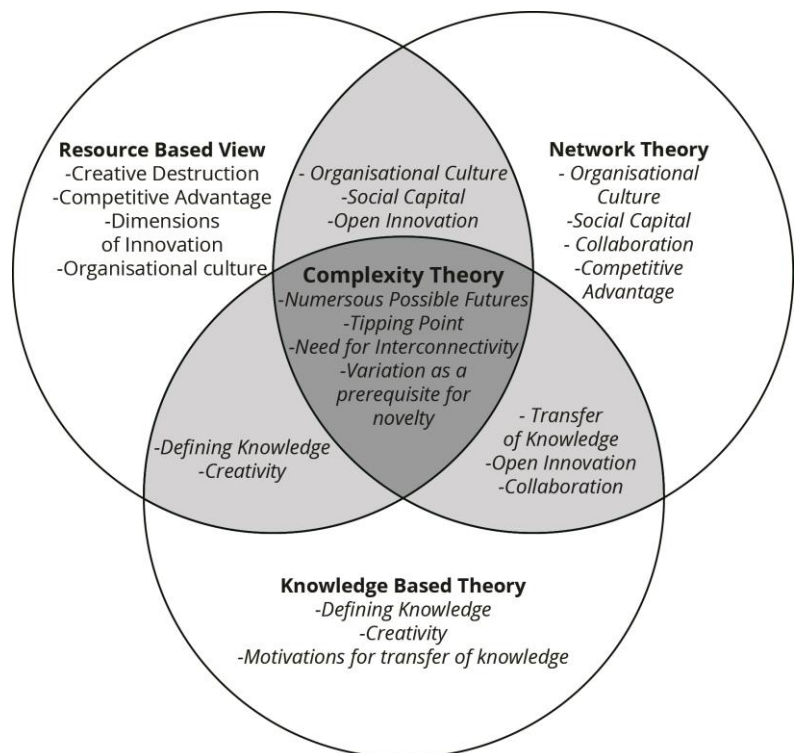


Figure 4 Complexity Theory Framework Model

## Chapter 3 - Research Design/Methodology

### 3.1. Introduction

This chapter describes the research design and methods used to gather and analyse data in order to address the research questions and gain a better understanding of the knowledge flows and innovation cultures in New Zealand businesses.

### 3.2. Focus/Objectives

The goal of this research was to gather information and knowledge on innovation within New Zealand companies to provide an insight into the innovation practices within these companies. This study utilises a case study approach, focusing on a qualitative methodology, combining primary research from interviews and secondary data collected from existing industry case studies and reports.

The study examines issues identified in previous literature on knowledge sharing and collaborations whilst identifying areas of improvement with outcomes being directional suggestions for future research and industry practices.

As identified in Chapter 1, the research questions state: “What is the current innovation culture in New Zealand businesses?” and, “How do innovative businesses drive and accelerate the transfer of key innovation knowledge and skills for growth within the business?” In light of this, a major source of information and data was drawn from a report produced for the then Ministry of Science and Innovation (MSI) for the New Zealand government, *Powering Innovation* (MBIE, 2011) as a basis for this study.

### 3.3. Data Sources

This research project is based on a qualitative research approach as identified by Yin (2003), and developed case studies by combining primary data from interviews, as well as secondary data collected from existing studies and reports. These studies address the "how" and "why" questions that provide a basis for developing theoretical propositions for subsequent testing and theory development (Yin, 2003.)

As well as the theory building and adding to the body of knowledge for academic purposes of a Master's thesis, this study was also undertaken to gain practical insight from local companies to help address the issues identified in *Powering Innovation* (MBIE, 2011) and similar reports.

Data collection by way of semi-structured interviews was sought from companies within the following industries in New Zealand, predominantly located in the Auckland region. The following lists areas of significant growth potential identified in the Innovation Growth Progress Report by The Ministry of Science and Innovation (2012.) These areas are:

- Food and beverage manufacturing
- Agri-technologies
- Digital technologies
- Health technologies
- Therapeutics
- Manufacturing
- High-value wood products

These companies are typically subject to innovative processes, such as product development, service development, or those with innovative business models. The high value manufacturing (HVM) sector was selected from this list and an explanation follows in the next section.

### 3.3.1. A Focus on the High Value Manufacturing Sector

For the purpose of this study, the high value manufacturing sector was selected from the Ministry's list to be studied through interviews conducted with top level managers in their respective companies.

There were several reasons behind this selection of industry sector and type of company. Firstly, as mentioned in the ministry's report, this sector is primed for future growth in the New Zealand and international economies through diversification of industries outside of the primary sector (MBIE, 2011.) The HVM sector brings higher productivity returns, in turn contributing a higher rate of return to the New Zealand economy.

Furthermore, the report identified that the HVM sector has significant opportunities for development and growth and also as having an identified need for networking. The *Powering Innovation* report (MBIE, 2011,p4) states that:

*“Unlike other sectors important to the economy, such as agriculture, the HVM sector is exceptionally diverse and fragmented: it is composed of a large number of technology sub-sectors that are not unified by an overarching national strategy or vision.”*

Diversification away from New Zealand's primary industries has been a suggested strategy by several commentators, including the *Powering Innovation* report (MBIE, 2011), Hendy, in his recent book (2013) and as far back as Porters suggestions in 'upgrading New Zealand's competitive advantage (1991). All examples cited Finland as an example of a country which as noted in Chapter 1, diversified its economy decades ago. The result from such diversification led to much higher prosperity and GDP levels than that of New Zealand, suggesting the need for and importance of diversification.

As also stated in Chapter 1, manufacturing exports account for 25% of New Zealand's total exports and whilst this is small than the combined primary industries, it does represent the largest single industry sector. Furthermore, the R&D expenditure of the HVM sector has been identified to be higher than that of the primary sectors.

Each of these points provides the basis for selecting the HVM sector as the area of focus for this study, since it represents a sector which has the greatest potential for development through innovation.

### 3.4. Overview of the Sample Characteristics

Table 3 shows a brief overview of the companies interviewed, with columns indicating operating industry, number of employees, level of innovativeness as stated by the interviewee and their annual spend on R&D or innovation of each company where available. As mentioned in Chapter 4, all companies were involved in High Value Manufacturing (HVM) except one which was a service provider. Most of the manufacturing companies also developed a certain level of information technology that powered or accompanied their respective products, such as computer controlled machinery.

The size of company is measured by the number of employees, which are identified within ranges grouped according to those in the New Zealand Business Demography Statistics (Macpherson, 2013) report by Statistics New Zealand.



*Table 2 Characteristics of Interviewee Companies*

Company #	Operating Industry	Size of Company (persons)	Interviewees Perception of Innovativeness	Annual Spend on R&D (%)
1	HVM + Information Technology	20-49	6	5-10% sometimes 15%
2	High Value Service and product development	100+	6 to 7	-
3	Information Technology	10-19	4	-
4	HVM + Technology	50-99	9	2.5%
5	HVM + Information Technology	50-99	11	
6	HVM	10-19	9	8%
7	HVM + Information Technology	50-99	8	7-10%
8	HVM + Information Technology	20-49	7	-

### 3.4.1. Other Sources of Data

Government agencies and relevant trade organisations also provided valuable industry overviews of the innovation environment within New Zealand. Examples of such agencies and organisations include Enterprise North Shore, New Zealand Trade and Enterprise and Better by Design, from whom potential participants for surveys and interviews were selected using their databases. Other sources for the sample included New Zealand Deloitte's fast50 companies and the New Zealand innovators awards lists. The Companies Register and other publicly available business databases were also utilised.

Reports and case studies were instrumental in gaining a strong understanding of the current innovation climate in the present New Zealand economy. Reports were drawn from both governmental reports and those independently published.

The *Powering Innovation* (MBIE, 2011) report was instrumental in forming the groundwork and reasoning for conducting this research prior to the literature review. The research questions were formulated as a result of issues not covered in the report and could be seen as the next logical step following the report.

In addition to the *Powering Innovation* report (MBIE, 2011), other sources of publicly available secondary data were utilised to cross reference and triangulate (O'Donoghue, T. Punch, 2003) any data uncovered during the interviews. These data sources included:

- Government publications (e.g. Ministry of Science and Innovation, NZTE)
- Trade and industry publications
- Business incubators (Icehouse, AUT Business Innovation Center, Massey eCentre)

### 3.5. Primary Data Collection

Semi-structured interviews were utilised to provide a platform for open discussion (Yin, 2003, p89) and open up the opportunity for deeper underlying themes or issues to emerge that may arise during the interviews. Target companies were identified as 'innovative' by way of industry awards or acknowledgements and from within the HVM sector as specified earlier, within the greater Auckland region.

As a result of the time and resource constraints, companies were selected initially by way of purposive sampling (Shadish & Cook, 2008) in order to attain the best available interview data on the complex topic of innovation and knowledge management. Furthermore, upon completion of the first four interviews, a snowballing effect (Biernacki & Waldorf, 1981) led to completing the remaining four interviews with a number of the initial interviewees' networks of contacts.

Of the companies invited to participate in the study, a total of eight in-depth interviews were conducted. All except one of these firms are involved in high value manufacturing. The remaining company is a high value service provider, but is heavily involved in product development.

#### 3.5.1. Interviews

Interviews were conducted with management leaders. These participants were chosen as key informants in middle to upper management positions involved in developing the innovation processes of their companies. Interviewees were typically the R&D manager or held a similar focused role.

The questions asked were themed according to four areas of focus as identified in the literature, and purposely constructed to address the research questions. These areas of focus are:

- General innovation/R&D practices and overviews
- Innovation Management
- Innovation Knowledge – practices and sharing etc.
- Open innovation and collaboration

Emphasis in the interviews was placed on identifying issues, problems and challenges that companies face when undertaking innovation processes and actions. The interview opens with a 1 – 10 Likert-style rating scale aimed at determining the interviewee's perception of his or her company's level innovativeness. This was designed to be a simple introduction to the interview as well as provide an early assessment for the purpose of guiding the remainder questions.

The remainder of the questions were semi-structured and directed at identifying specific areas of knowledge management as well as assessing these companies' collaboration networks, why they choose this path and how they undertake and manage collaboration. These questions were designed to address the research questions; yet, are sufficiently open ended to allow hidden themes or ideas to emerge from the conversation (Bryman & Bell, 2011.)

Interviews were digitally recorded, and professionally transcribed and accuracy was checked by sending the transcriptions back to the interviewees for validation, and also in order to cross check them with the audio recordings (Bryman & Bell, 2011.)

A list of indicative interview questions can be found in Appendix Three.

### 3.6. Ethical Issues in Data Collection

Any research that requires collection of primary data is subject to ethical consideration. It is the researcher's responsibility to ensure that the participants are well informed as to the reasons for and purpose of the research, as well as understanding their rights to privacy and confidentiality (Yin, 2003.)

This research gained the approval of the Auckland University of Technology Ethics committee (AUTECH) prior to undertaking the study - see Appendix One.

Prior to the commencement of the interviews, the participant was presented with information about the purpose of the research, detailing why and how it would be conducted. They were assured of their privacy in the reporting of the data and the confidentiality of the information they provided in the interviews and how the data would be stored.

This information was given by way of a participant information sheet and can be found

in Appendix three.

### 3.7. Data Analysis

Qualitative analysis was the approach implemented involving thematic analysis to examine the results of the semi-structured interviews and resulting data. Themes were identified by way of patterned responses and meanings (Braun and Clarke, 2006). These themes were identified as closely matching the topics covered in the literature review in Chapter 2 to gain insight into the most common issues raised and discussed during the interviews. This analysis was however undertaken without prescribing the themes too closely in order to allow the possibility of discovering any unexpected data or insights.

Theoretical sampling was used to develop categories from the data (Corbin & Strauss, 1990) to further gain an understanding of the issues outlined in Chapter 1 as identified in the government report *Powering Innovation* (MBIE, 2011.) Themes were then grouped, explored and analysed in an effort to build theory as well as provide insights into innovation knowledge and skills transfer, in relation to the research questions.

Coding and theming was completed by hand due to the relatively small amount of data. Four key concepts emerged from this process and were used as the main elements of analysis to address the research questions, to build theory and inform best practice. These four concepts were: *innovation management and culture*, *knowledge management IP protection*, *collaboration and open innovation*, and *other issues* which include *financial challenges* and *risks* and will be covered in the next chapter.

### 3.8. Reliability and Validity

The nature of the literature review and the interview questions led to a data set which is specific to addressing the research questions and topics of the study. As a result, this formulated a predisposed approach to the data analysis (Braun and Clarke, 2006.) This process assisted in validation of the dataset by way of triangulation or cross checking the primary data with the topics discussed in the literature review (O'Donoghue, Punch, 2003.)

### 3.9. Research Limitations

The research was limited by time and resource restraints associated with the requirements for completing a Master's degree thesis which required that the scope and complexity of the study be restricted to a manageable scale within the designated time

frame.

The sample size and scope of the interviewees and their companies imposes limitations on the validity of the results that could be achieved within the timeframe, inasmuch as the results are unable to be generalised to a larger population without caution.

Furthermore, the limitations of interviewing only eight companies also apply to the validity of the study as the sample size and selection does not indicate innovation and knowledge sharing nationwide nor industry wide.

### 3.10. Summary

This chapter has described the research design and analytical approach employed for this study. The chapter has discussed data sources and participant selection in the form of purposive sampling with a focus on the high value manufacturing industries in Auckland. Primary data collection involved semi-structured interviews with middle to upper level innovation and R&D management leaders at innovative firms. Secondary data was collected in the form of government and industry reports assist the reliability and validity of the data.

Ethical considerations were discussed in relation to gathering the primary data. The chapter describes the details of qualitative data analysis by way of thematic analysis and patterned responses and concludes with reliability, validity issues and the studies limitations.

The next chapter presents the results of the data analysis and discusses the findings from the interviews.

## Chapter 4 – Findings and Discussion

### 4.1. Introduction

This chapter discusses the findings from the research. The chapter begins with an overview of key topics, followed by presentation of the interview responses, which are discussed and compared with the key themes in both the government reports and the theoretical and empirical material reviewed from the literature.

### 4.2. Key Topics

In reporting the findings from the interviews the presentation of responses follows the four core themes in relation to the research questions: (1) innovation management and culture, (2) knowledge management and IP Protection, (3) collaboration and networks, and (4) other issues which cover financial challenges and risk.

The innovation management and culture theme explores the current orientation of the firm towards an innovation, indicators of the firms understanding of creativity and management styles found in the interviewed companies. As discussed in Chapter 2, these elements can be regarded as indicative of an innovation culture within an enterprise.

Knowledge management and IP protection are core themes relating to the interviewed companies' state of innovation management and their approaches to IP protection.

The theme relating to collaboration and open innovation refers to the company's understanding of these concepts, and the extent to which they collaborate and network, both internally within the company and externally with partners.

The final theme covering financial issues and risks is a core theme which emerged during the interview process. Risk, in particular, is highly pertinent to innovation; yet, surprisingly it is not addressed in the literature in this field. Risk was a theme in the interviews commonly associated with discussions relating to issues and challenges in the firm.

Results and discussion relating to these four topics are presented below.

#### 4.2.1. Innovation Management and Culture

The opening questions in all of the interviews concerned respondents' perceptions of

their company's innovativeness. Respondents were asked to rate their firm on a scale of 0 to 10, with 0 being not innovative at all, and 10 being exceptionally innovative. This line of questioning was intended to gain an understanding of how the interviewee thought about their company in relation to innovation, and to establish an orientation in thinking for the remainder of the interview.

For the most part, most firms (number) were perceived to score at least 7 out of 10 for innovativeness. One firm, the least innovative, rated themselves a 4 out of 10 which, based on innovation literature (Damanpour, 1991; Ekvall, 1996; Loop, 2011), is seen to be fairly representative of business practice. Notably, centralisation, specialisation and managerial attitude (Loop, 2011) among other factors represented a fairly non-innovative company culture (Damanpour, 1991.) However, although the interviewee in this case believed the company to be not very innovative, there was some degree of innovation in practice. For example, there was a specific project mentioned by the interviewee, where some of the engineers undertook product development to better serve their clients' solutions. This project was not fully completed. In this case, the company suffered from lack of resources (Damanpour, 1991; Ekvall, 1996) in the form of man power needed to complete the innovation due to the need for "business as usual". It was further identified that this was largely due to the managerial response to the needs of business as usual taking precedence over innovative activities and as a result the interviewee believed that because of this failed project the company was not very innovative.

There were at least two firms that understated their innovativeness. In one instance one of the firms was assigned by their respondent a rating of 6 out of 10; yet, the company was, in practice, closely aligned with literature (Ahmed, 1998; Ekvall, 1996; Eric von Hippel, 1994) on innovation best practices. This was apparent when compared with all of the other company's innovation management and practices in the sample. Elements of this company's practices such as a decentralised management structure, on-going innovation resources, specialisation and most notably, the freedom to explore ideas and the idea support (Ekvall, 1996) from management was apparent throughout the company and were all indications that this firm's innovation processes were in fact the most refined of all companies interviewed.

When asked about the company's innovation and R&D management practices, most firms had a variation of an R&D process or pipeline, with the most common being an agile, "stage and gate" process. This refers to a term where, during product development, the process is well planned with deadlines or delivery points throughout. These 'stages' are then overseen and analysed by an upper level management person or

team referred to as ‘the gate’, and approved before the innovation moves onto the next stage (Cooper & Edgett, 2012.)

Five of the eight companies adopted a separate R&D program that is external and disengaged from, yet simultaneously alongside their everyday “business as usual” operations. This indicates a well-established perception in the innovative firms that R&D is a separate function to business as usual and, by separating the two functions, allows everyday business to operate unhindered.

#### 4.2.2. Management and Hierarchy

The management practices identified in all except one firm comprised a flat organisational structure with up to two levels of reporting. The exception was one large corporation with a very traditional hierarchical structure.

Elements of traditional management structure consisting of levels reporting (as opposed to a collegial environment of professionals) (Martins & Terblanche, 2003) still remained in all of the firms. However, these were often perceived by the interviewees as more leadership positions rather than as top down, directive positions. Managers in these firms preferred to adopt a position of leadership and driving the visions of the firm. These findings corresponded with the literature on innovation management, where management processes, mission and vision and leadership qualities were found to be key drivers in the innovative culture of an organisation. (Damanpour, 1991; Martins & Terblanche, 2003.) In particular, the hierarchical levels of management that are found to hinder innovation and creativity (Damanpour, 1991) were found to correspond with the differing levels of management in the companies interviewed.

In nearly all of the cases where companies had R&D practices in place, there was some form of innovation driver team or steering committee, which was mostly made up of upper level management: CEOs, R&D managers, workshop managers, sales and marketing, among others. This team meets on a regular basis to manage and drive innovation within the firm. This was found to be consistent with literature on the dimensions of culture (Martins & Terblanche, 2003) illustrating the importance of leadership and mission and vision throughout organisations in order to drive and reinforce the company’s innovative culture.

#### 4.2.3. Innovation Management

The businesses interviewed for this study managed this source of innovation as a significant resource, which they often treat with high regard and due care, since it



represents the future of the firm's survival, and as found by Roberts (1999), sustainable profitability is directly related to the firms culture and ability to innovate.

In the cases of the companies interviewed that had a flat organisational structure, these companies had a firm grasp of the importance of collaboration for learning and knowledge acquisition (Powell, Koput, & Smith-doerr, 1996) promoting an innovative culture (Ahmed, 1998) and knowledge sharing (Huysman & Wulf, 2005.) This was seen by the many relationships that the interviewed companies had with external stakeholders such as designers or engineers. There was an element of business size by way of a smaller number of employees that allowed the company to maintain a flat management structure, thereby allowing increased collegiality and ability to share ideas and knowledge. The larger companies interviewed had more explicit and longer reporting structures, so that information sharing was less efficient. Despite their traditional management structures, however, it was found that intentional efforts were made to promote collaboration and innovation (Ahuja, 2000; Martins & Terblanche, 2003.) For example, one company had a formalised idea management program where employees could submit ideas for improvement of products or processes that would then be reviewed by management, and if successful, consequently implemented. This was reported to be a successful practice in several companies interviewed.

Half of the larger firms interviewed reported the necessity for an innovation steering committee to lead and drive innovation forward in the company. This finding indicates that the idea of a true 'flat organisational structure' is still an idealistic management practice as there still needs to be leadership to champion innovation in the right direction.

To further the necessity for an innovation steering committee, the separation of R&D from business as usual is a management tactic of creative destruction (Schumpeter, 1942) as a source of innovation (von Hippel, 1994.) The notion of why it is done is to separate highly innovative product development, seen as 'destructive', away from the normal operations of the business so as not to distract management and staff from maintaining current production or interfere with the performance of the current product range.

#### 4.2.4. Knowledge Protection

Knowledge management and protection were key issues addressed during the interviews and generated a considerable amount of in-depth discussion.

All companies interviewed had processes or systems in place for knowledge storage,

from simple tangible central computer servers, document and drawing processes, to staff retention tactics for protection of intellectual property associated with their core competencies.

Six of the eight companies interviewed hold patents; however, only two of those companies actively defend their patents. Nevertheless, all of the companies prefer to focus on speed to market and on being first movers in their industry rather than rely solely on patent protection.

In one case, the company, which holds a second equal global market share position in their niche industry, recounted how, after being first to market, fell from being market leader to a follower position and then as a result had to play catch up. The respondent termed the company a “fast follower” which often included “jumping ahead of the competition” in terms of bringing new product to market, for a period of time.

All except one of the companies interviewed indicated that they have traditionally filed for patents and IP protection. However, in recent years the company which does not employ patent protection has struggled to find the cost benefit in pursuing what they perceive as an expensive from of protection. The respondent noted two limiting factors: cost in dollars of patenting, and cost in time to complete the process. The respondent noted further that by the time the company's patents are granted, their technology and innovations have already moved on and advanced to a new level, so that the patent is for an obsolete innovation and may no longer be worth the expensive protection.

In one further instance a case company by comparison was so disruptive (Baregheh et al., 2009) in its innovations that it was not only a first mover however found it necessary to create the industry/market in order for their product to gain traction. In this company's case, the respondent was clear in stating that the company's IP protection enabled them to secure their competitive advantage in the global market place. Several years later, the company still holds a market leadership position. Moreover, their product has gained traction locally and internationally, which as mentioned by the respondent is a situation that would not have been achieved without first obtaining proper IP protection and defending it.

This case illustrates a perfect example of knowledge as a highly valuable resource in an organisation (Argote & Ingram, 2000; Grant, 2013.) Such knowledge has positioned the company at a competitive advantage where they are dominant in their specific industry.

There is an indication from the interview results that this level of IP protection tends to

be maintained by larger companies with access to the resources, (money, knowledge, etc.) to do so, leaving the smaller companies at a disadvantage from being unable to afford such protection. It was found that this often resulted in a perceived barrier to innovation for the smaller companies due to the belief that the lack of funding and resources means that innovative activities are unachievable.

The following section examines alternatives to knowledge protection when a company is too small or too resource constrained to properly protect their IP.

#### 4.2.5. Knowledge sharing, the alternative to knowledge protection

The above example of the value of IP protection is nevertheless an exception among the other companies interviewed. Only two companies held a defending position in relation to their intellectual property, in the form of appropriate IP protection. The remaining companies in the sample compensated for this disadvantage by placing greater importance on being first to market with their innovations rather than following traditional routes of IP protection.

It is well known that knowledge is a valuable resource for the firm (Grant, 2013; Yang & Rui, 2009), and knowledge transfer provides the company with a certain level of competitive advantage (Argote & Ingram, 2000; Tsai, 2001); therefore, it could be suggested that in lieu of traditional patenting and IP protection the benefits of knowledge sharing in the pursuit of innovation and R&D should be stimulated and encouraged. The results in this study showing that companies are not placing value on IP by striving for IP protection places an interesting perspective on knowledge transfer in several ways.

Firstly, patents in themselves are a version of codified knowledge that is deemed a competitive advantage to the firm filing it (Argote & Ingram, 2000.) This process inherently provides an excellent form of knowledge sharing. The patented knowledge is effectively closed off to would be adopters, without going through expensive and complicated licensing deals.

However, if firms are not filing for patents, as they once might have, for reasons of cost and time two distinct insights can be drawn from this practice. First, there is a knowledge gap appearing from the general lack of patents that these firms are filing. The knowledge that once would have been shared through the patent is now kept within the organisation, and effectively is not shared at all.

Second, a firm's reluctance to protect their IP suggests at least two possibilities. One possibility is that among the firms there is a certain degree of complacency over their IP

or competitive advantage that these will not be encroached upon by competitor firms. Alternatively, firms that are unable to pursue traditional protection may leave the company with no option other than to aim to be the first mover and continue to innovate faster than the competition.

The findings in relation to the case companies' approach to IP protection imply that in the absence of IP protection and the reliability on the first mover advantage, firms can and should be more liberal with their knowledge. In particular companies could benefit from sharing their tacit knowledge, which is often of high competitive advantage value.

As Suggested by Von Hippel (2007), knowledge sharing in the form of open innovation has the ability to be beneficial, especially when treated as a transactional sharing between two companies or parties. Taken further, Huysman and Wulf (2005) identify knowledge sharing as a key element of social capital (Burt, 2004), which in turn is a core input of developing an innovative culture (Martins & Terblanche, 2003.) The benefits and risks of knowledge sharing are further elaborated in the following sections.

#### 4.2.6. Collaboration and Open Innovation

All of the eight companies' respondents reported differing degrees of collaboration while instigating innovative activities. Collaborations and connections varied from simple supplier or manufacturing connections in the form of transactional relationships to fully fledged R&D collaborations with design and engineering schools within local universities. Among the firms in the sample, the larger the company, the less it appeared to collaborate or work with outside firms, choosing instead to solve its issues and providing solutions internally using its own teams. Respondents in the larger firms for whom this approach was typical, reported transactional relationships with external service providers such as advertising and design agencies. However, these network relationships do not appear to contribute to the innovation or R&D practices of the firm. As indicated by one firm:

*“We use [a design firm] quite a lot, or have done in the past. Particularly at the design level as opposed to the sort of core innovation [level].”*

This is most likely due to the size of the large company's resources, where it has dedicated teams within the organisation, whereas smaller companies do not have such resources. Smaller firms will therefore tend to collaborate with outside organisations to achieve marketing, design or engineering tasks among others.

Three of the eight larger companies in the sample collaborate with universities on an

on-going basis, citing universities as a good source of new technology and personnel. This echoed common theories of collaboration in the literature (Ahuja, 2000), as being a good source of innovation (von Hippel, 1994) and knowledge (Tsai, 2001.)

One company cited an instance of collaboration between the engineering department of one local university and the company in commercialising the developed technology. This particular project involved collaboration with multiple stakeholders simultaneously in the process of developing the product over several years, the main stakeholders being the university, their customers and a transactional collaboration with an industrial design firm. Between their own development team, the universities engineers, the designers, and with the invaluable input from the customers themselves, this company has been able from their collaborative efforts to develop a world first in their specific product range.

In another case involving one of the larger companies interviewed, an example of knowledge transfer arose from a collaboration with a crown research institute (CRI) in New Zealand. This particular case saw the integration of technology developed by the research institutes engineers into their own product offerings, thus enabling them to develop and build a completely new product range to accompany their already largely successful products.

These companies have managed their collaborative efforts over many years, and they understand that knowledge is a highly valuable resource (Argote & Ingram, 2000) the company is adept at utilising their network ties to obtain and transfer the knowledge needed (Burt, 2004; Tsai, 2001.) This approach is consistent with the literature on network positions of companies where this is positively related to innovation output (Ahuja, 2000.) As a result of these on-going collaborative efforts with external stakeholders, such companies are dominant world leaders in their respective industry niches.

These two case examples of collaboration illustrate the opportunity for collaborative innovation to work favourably for the company and prove that successful collaboration is happening in practice. However, among the sample group this was found not to be the norm, with only two of the eight companies interviewed actively collaborating with external stakeholders. Instead, collaboration seemed to be commonly and mistakenly identified as the transactional relationship with a contractor or supplier rather than true collaboration where two entities work together towards a common goal. This finding was consistent with the view expressed in the *Powering Innovation* report (MBIE, 2011.) The report states that “Connectivity issues regarding a lack of

networking and collaboration between organisations and industries”, and also “[an] overall lack of experience in using R&D and of understanding what R&D and its capabilities mean for an organisation.” clearly identifying areas of potential improvement within companies.

With any relationship with an external stakeholder, there is an opportunity for knowledge transfer in the pursuit of gaining competitive advantage (Argote & Ingram, 2000). It may thus be more appropriate for companies to differentiate in their external relationships between true collaborative and transactional partnerships, and manage these as knowledge mining opportunities.

#### **4.2.7. Employees Individual networks**

Four out of eight firms reported informal industry network group meetings. These meetings involved professionals holding similar positions within different companies who meet specifically to discuss innovation. Two firms were inadvertently involved with the same informal group, which should not be surprising given the proximity of both firms in the same high tech electronics industry in the same city. This is consistent with the literature on collaboration and network ties (Burt, 2004), where connections through close proximities of location and industry promote like-minded people and ideas. This indicates an understanding of the importance of knowledge transfer as a competitive advantage by the R&D managers of these respective companies.

There was emphasis placed on the lack of competitors being 'let into' these informal groups, which illustrates the apparent value of the companies' group knowledge and the ability for it to be transferred. This was consistent with the literature on knowledge as a competitive advantage (Argote & Ingram, 2000.)

The benefits of knowledge sharing will be covered in further depth in relation to the results below.

#### **4.2.8. Collaboration and Knowledge Challenges**

Informal group meetings are a valuable source of new knowledge for the companies and individuals that are involved; however, only half of the firms interviewed participated in the meet-ups.

The biggest challenge for these firms is the facilitation of knowledge sharing. Informal networks are one identified vehicle of transfer; collaboration with external networks, as discussed above, is another mechanism.

However, when discussing where companies find their knowledge or information to help them solve their business challenges, despite the examples of collaboration and informal networks, all of the sample companies mentioned a difficulty of finding new knowledge sources when looking for information. Some mentioned CRIs such as NZTE or Callaghan Innovation as information sources, but were quick to point out that the CRIs mostly facilitated support through funding rather than the facilitation of knowledge or information.

Four of the eight companies identified universities as a key source of new information and knowledge for them. Others in the sample cited industry associations, network groups and even the benefits of the internet, as valuable resources.

However, there was an identified limit to this knowledge source. Two of the more advanced companies involved in developing new and ground breaking technology both stated that acquiring and maintaining new knowledge, information and technology is among their top issues in their R&D processes. This was still the case despite holding strong relationships with universities, industry and government associations.

This finding is consistent with barriers identified in the *Powering Innovation* report (MBIE, 2011) “*a lack of access to knowledge by industry and transfer of knowledge from R&D sector to industry.*” This finding suggests that once a company reaches a certain point of market leadership the lack of knowledge required to develop new innovations slows their progress as well as their future growth prospects. Both companies in the sample indicated a need for a centralised source or network of knowledge that is not currently provided by the universities or government institutes and agencies. Other companies also agreed when prompted on this issue.

The differences in each company interviewed, with regard to their innovation management processes, IP management and lack of clarity in their understanding of the difference between collaborative and transactional relationships further support point number one from the *Powering Innovation* report (MBIE, 2011) which is: *Connectivity issues regarding a lack of networking and collaboration between organisations and industries.*

The results suggest that there is a greater need for more networking and collaboration implemented at a company level.

### 4.3. Other issues and challenges

In the preceding chapter the results presented follow the themes and key constructs addressed in the literature. What follows is relates particularly to findings that are not

addressed in the literature although emerged from the interviews and data analysis as important issues and challenges for companies. These additional aspects relate to financial issues, human resources and risk complications.

These findings are important because they appear to make links between concepts not previously made in the literature and therefore, help to integrate and bring further understanding to innovation management and practices in companies.

When asked about common everyday issues and challenges that innovative companies face, most in the sample were quick to respond with two common themes: *finance* and *human resources*. However, a third issue not linked with innovation in the literature arose during the interviews and emerged as a significant theme from analysis of the transcripts: risk.

#### 4.3.1. Human Resources

Half of the respondents stated that finding and recruiting high quality employees with technical knowledge and capabilities in roles such as engineering, IT and sales, was a recurrent and on-going problem.

One company reported that finding the right people who are appropriately skilled with the appropriate knowledge for the highly innovative company was a major challenge stating: *“Getting the right people can take some time, sometimes it’s quite hard and sometimes it could be easy”*.

Another company made it clear that its single biggest challenge is human resources.

*“The biggest challenge for (us) is around staff. Like actually employing quality high performing engineers. It’s one thing having a skilled worker but they need to be passionate and with a love of something. To find guys with the x factor is tough.”* This interviewee further stated its human resource issues as a barrier to speed to market: *“...and the only thing slowing us down at the moment is finding good people.”*

This problem is consistent with the capability issues identified in the *Powering Innovation* report (MBIE, 2011, page 8) which states that there is:

*“...a shortage of professional skills in a number of areas in business and advanced technology. It is estimated that NZ needs 2000-2750 new engineering graduates each year but in 2008 there were only 1500.”* However it could be added that there are a number of graduates that do not remain in New Zealand following their graduation.

The report further states (2011, pg. 8) that: *“for companies with internalised R&D functions, [there is] difficulty in attracting university graduates or graduates with*



*required capabilities”.*

These findings relating to human resource aspects and employee capabilities indicate a lack of specialised knowledge in companies, confirming issues outlined in the *Powering Innovation* report (MBIE, 2011); “A lack of access to knowledge and transfer of knowledge from the R&D sector to industry, linked to an overall lack of experience in using R&D and of understanding what R&D and its capabilities mean for an organisation.” It was also clear that the need for knowledge resources as a competitive advantage (Argote & Ingram, 2000; Porter, 1985) is acknowledged and common among interviewed companies.

### 4.3.2. Financial Issues

All companies interviewed mentioned financial challenges in some form: cash-flow, working capital, R&D investment, as being problematic in managing the day-to-day business and, in particular, in driving R&D.

Again, this is consistent with the *Powering Innovation* report (MBIE, 2011), where the report states a low 1.3% of GDP is typical for R&D expenditure compared with an OECD average of 2.33% (MBIE, 2011. Page 1.)

Interviewees reported a range of R&D levels of investment ranging from 2.5% to 10% of operating revenues as shown in Table 3 – Characteristics of Interviewee Companies. It is nevertheless notable that even at the lowest point in the range at 2.5% among the sample companies investment in innovation is higher than New Zealand's, and even the OECD group's, average R&D expenditure. This finding confirms these companies as innovating firms. Further analysis of financial issues reported by respondents identified a consensus regarding even these levels of investment as being insufficient to drive R&D in these companies. As stated in the *Powering Innovation* report ((MBIE, 2011, page 9): “...investment or funding was mentioned as a barrier in every submission” further identifying a “low level of R&D funding by government”, and “under investment by the private sector and lack of risk capital for R&D led innovation, especially for small companies to take projects from ideas to commercialisation and complete the value chain.”

While companies may have sufficient money for business as usual, for R&D and driving innovation there are clearly insufficient funds to bring new projects forward.

Companies are facing a “catch 22” in terms of sustainable innovation versus business as usual where the resources required to undertake innovation and R&D put the daily

business as usual at risk. However without innovation, the whole business remains in danger of being left behind and going out of business.

A chronic shortage of relevant skills, expertise and a low capability pool combined with a persistent lack of available funding inevitably increases the level of risk associated with venturing through innovation, which leads into the next important finding from the interview data.

### 4.3.3. Risk

The biggest single issue company's face when dealing with innovation that arose from the interview process was that of risk.

Seven out of eight respondents from the case companies mentioned risk spontaneously without being prompted or directed to the topic of risk management.

*"Managing risk of opportunity, got the check-list that's actually checking what the level of risk is and to try to get some measurement on minimising that risk."*

Some of the companies are aware of this risk and encourage innovation: *"...not afraid to take some really innovative concepts on board, we don't sort of hold back too much on what we try."*

One company in particular mentioned risk appetite, acknowledging that there are always failures along the way and *"not crucifying people when it goes wrong"* noting a tolerant culture and ending on an insightful *"How you react to failures is more important than actually having them or not."*

The remainder of companies all raised risk issues identifying R&D as a problematic, yet necessary exercise. These companies link inextricably their cash issues to R&D risk management. One of the most innovative firms stated this with reference to risk:

*"The ones [innovations] that are kind of in the safe area are easier to estimate the market and then there are some that are more the high market risk, high product risk. Hard to guess the market but you think it's going to be big, so you try and spend some money on those anyway. Even if it's not clear about the market, because those are the things that could be the big winners, so we do some of that kind of analysis. And trying to have a bit of a balance in the portfolio you're doing. You don't want to be too conservative because then you're not taking any big risk, you can't be too risky though..."*

The above is a good overview on risk assessment and analysis; however, when discussing R&D expenditure this company identified that they would be "slower" and

be 'more conservative' with their innovation programs without having access to external funding for R&D from the government.

This finding was seen to be true with all other companies interviewed. The two companies with what they regarded as high-risk appetites both had large funds for innovation with one of them having extensive grants from Callaghan and NZTE as well as investor funding. Conversely, the lower innovation level companies were found to have low-risk appetites, and often an aversion to risk. It is important to note that these companies did not have any access to outside funding for R&D.

The findings suggest that the low level of R&D activities from the private sector could be due to a level of risk aversion to innovation where companies are simply unwilling to allocate money and resources for a result that traditionally involves a risky and unknown process.

It could be thought that when money for innovation is sourced from elsewhere, such as government grants, however, companies appear more willing to raise their risk profile without the worry of losing their own money in the innovation process. Therefore, whilst money is a driving factor behind companies' lack of innovation activities, it would seem that it is not only lack of money that is the issue, but rather it is the lack of risk appetite that stems from the financial position that prevents some companies from innovating.

#### 4.4. Summary

The findings from the interviews followed four core themes derived from the literature, in relation to the research questions: *(1) innovation management and culture, (2) knowledge management and IP protection, (3) collaboration and networks, and (4) other issues* that emerged from the interviews relating to *financial challenges and risk*.

From the findings most firms had attempted to retain a flat management structure throughout their company to promote innovation; however, there was still a requirement for a driver of innovation in the form of management leaders or steering committees. A truly flat management is still an idealistic idea in innovative companies.

IP protection was identified as an important resource providing competitive advantage; however, it was generally reserved for the larger companies with the money and other resources to pursue IP protection. This left the smaller companies opting to pursue a first mover advantage when launching innovations. As suggested previously, such companies could share their knowledge with similar industry peers.

Collaboration issues were found to be consistent with the findings and suggestions in the *Powering Innovation* report (MBIE, 2011), with the addition of a lack of differentiation between collaborative and transactional relationships which could be better managed to benefit the company. Individual network meetings were an important element of knowledge sharing for the larger firms yet this approach was not practiced by all of the companies in the sample group.

Lastly, other issues included financial issues, which were found to be holding back innovation and R&D in most of the companies, while risk aversion was found to be an important underlying issue in all firms. Issues relating to risk often hinder the innovation process.

The findings in this study were largely found to be consistent with *Powering Innovation* report (MBIE, 2011), however the report had a complete lack of focus on companies risk management issues as a main barrier to innovation. This resulted in the study focusing on other barriers such as knowledge management and collaboration, and as a result, the main finding of the study was the identification of just how much risk aversion affects innovation within companies throughout New Zealand.

## Chapter 5 – Contributions

This chapter presents the contributions to literature and implications to industry.

### 5.1. Contributions to Theory and Practice

Interviews confirmed that creative culture and company innovation is not at the level that it could be to promote creative destruction (Schumpeter, 1942) to its fullest potential, and ultimately contribute to the economic growth of New Zealand as identified in Chapter 1. It was also confirmed that collaboration and knowledge sharing are areas of weakness that need improving along with areas of human resources and financial challenges.

The first finding relates to collaboration between firms and outside organisations. The findings from the study show that a dominant transactional relationship prevails when companies collaborate. The difference between a transactional relationship and a cooperative relationship needs to be understood by companies and managed as appropriate with respect to knowledge management (Grant, 2013; Tsai, 2001.) Companies then need to develop the skills to initiate and manage cooperative relationships for the purpose of collaboration for innovation if such relationships are to lead to a competitive advantage (Barney, 1991; Porter, 2008.)

The second implication concerns knowledge transfer. The study showed that companies are finding it increasingly difficult to access the knowledge required in order to progress with their innovation projects. This finding implies that firms should consider how the transfer of knowledge addresses knowledge acquisition and storage. The study points to a need for a continuous stream of knowledge to be available to them, which is proving to be difficult for innovative companies to attain. However at the same time, the companies in the study show a decline in commitment to undertaking IP protection, preferring speed to market over expensive patent protection. The result of this is fewer patents filed, which has traditionally been a rich source of innovation information and knowledge. Industries need to explore and facilitate alternative routes to information and knowledge sharing.

Companies could consider a different approach to obtaining and managing knowledge in the future. The literature indicates that the most effective approach is one which is open and collaborative (Ahuja, 2000; Chesbrough & Appleyard, 2007.) While some companies will undoubtedly continue to collaborate on a transactional level, they could

look for areas of knowledge that can be shared for the mutual benefit of the transacting parties by way of a knowledge swap, benefiting both parties in some form.

The analysis process revealed a recurring theme not previously identified, which was that of risk, an area of investigation not fully researched in previous literature in relation to innovation and innovation culture in particular.

A link was identified between company's levels of risk appetite and their access to funding through means of government and industry grants. Often leaving the smaller companies that do not have access to financial resources for research and development struggling to progress along a path of successful innovation due to aversions to risk stemming from the unknown nature of research and development.

Although financial implications were central to companies risk profiles, it could be argued that many other factors come into play regarding risk, such as economic stability, current health and prosperity of a company's particular industry and access to resources other than financial, such as human or knowledge resources that enable innovation.

## **5.2. Implications for Industry**

For companies involved with innovation, the above implications can be seen from an industry perspective. This study highlighted risk as an issue in relation to innovation. The findings of this research suggest that risk is a major concern for small businesses and a major barrier to the pursuit of successful innovation and growth. The findings imply that companies do not manage this aspect well and appear to limit their appetite for risk in relation to investing in the type of innovation that will bring them a competitive advantage. There appear to be a number of reasons for this approach to risk including lack of resources or financial funding. However, if attitudes to risk remain excessively conservative then an innovation culture remains under developed and ultimately underutilised, leaving companies at risk of being left behind or going out of business. Companies must learn to manage and even embrace risk if they want to continue to grow and prosper.

## **5.3. Summary**

This chapter covered this study's contribution to both the literature and the implications to industry. The main findings included misunderstandings of collaboration between firms and difficulties of knowledge transfer when specialist

knowledge is needed for innovation. One Other finding was that of risk, and its barrier to innovation not previously identified or covered in depth in other literature.

The following chapter will present the conclusions for this study.

## Chapter 6 – Conclusions

This chapter presents this study's conclusions in a summary of the study. It identifies limitations of the study, and finally concludes with suggestions for future research.

### 6.1. Motivation and Background

The research in this thesis focused on aspects of innovation in New Zealand firms, following from the outcomes and recommendations published in a recent government report (MBIE, 2011) on innovation in New Zealand's High Value Manufacturing Industries. The study aimed to add to the body of knowledge in areas of organisational behaviour, knowledge management and collaboration and networks. Furthermore, by shedding further light on the 'how-to' aspects of knowledge management and collaboration these findings also aid in identifying methods of improvement for each of these aspects as a contribution to industry.

Overall, this research thesis sets out to address these two areas which formed the basis of the study in the form of the initial research questions: What is the current innovation culture in New Zealand businesses? And: how do innovative businesses drive and accelerate the transfer of key innovation knowledge and skills for growth within the business?

### 6.2. Summary of Study

Relevant literature was reviewed in Chapter 2, which formed the basis for constructing the theoretical background on which to base this study. Issues were identified from the *Powering Innovation* (MBIE, 2011) report, and compared with literature on creative destruction (Schumpeter, 1942), competitive advantage (Barney, 1991; Porter, 2008), organisational behaviour (Ahmed, 1998; Argote & Ingram, 2000), knowledge management (Grant, 2013), open innovation and collaboration (E. von Hippel, 2007), social capital (Burt, 2007) as well as complexity theory (Snowden, 2003.)

The four main theories of focus in the literature review came together to form a theoretical proposition identifying complexity to be a central principle, linking each of the other three theories to present a more complete picture of innovation culture in an organisation. The intersection of these three theories identifies complexity theory as a central theme that can be applied to innovation management. The main findings uncovered areas of management and collaboration that indicate room for improvement in how innovation is managed or further study.



The interviews uncovered strong elements of innovation and R&D management practices among the New Zealand firms examined, that were consistent with the literature. These practices included explicit innovation pipelines, the separation of disruptive R&D from business as usual and relatively flat hierarchal structures indicating that firms have a good understanding of innovation management and developing and maintaining an innovative culture throughout their firms. Among the most innovative firms in the sample there was a clear link between flat hierarchical management, creativity and innovativeness, as well as size of company.

Knowledge management and collaboration practices were common among all firms interviewed, and acknowledgement of the importance of collaboration as a knowledge resource (Argote & Ingram, 2000) was found to be high. However, there was an inconsistency within the sample group in the understanding between collaboration for innovation and transactional relationships with their suppliers and contractors. This suggests that companies need to differentiate between truly collaborative and transactional relationships and manage the knowledge associated with collaboration associated with innovation accordingly.

Knowledge acquisition was found to be a common issue for the companies interviewed. Typical difficulties included finding the right knowledge and technology as needed, and the need for more sources of innovation and knowledge to be available when needed. These needs could possibly be better met through the creation of specific industry innovation organisations and research institutes.

The results also revealed that these companies increasingly prefer to pursue speed to market with their innovations rather than follow a more traditional IP protection route. Reasons for this preference were based on financial and resource constraints, and although this method is perhaps fine as it is in some respects, there is scope for improvement. This finding

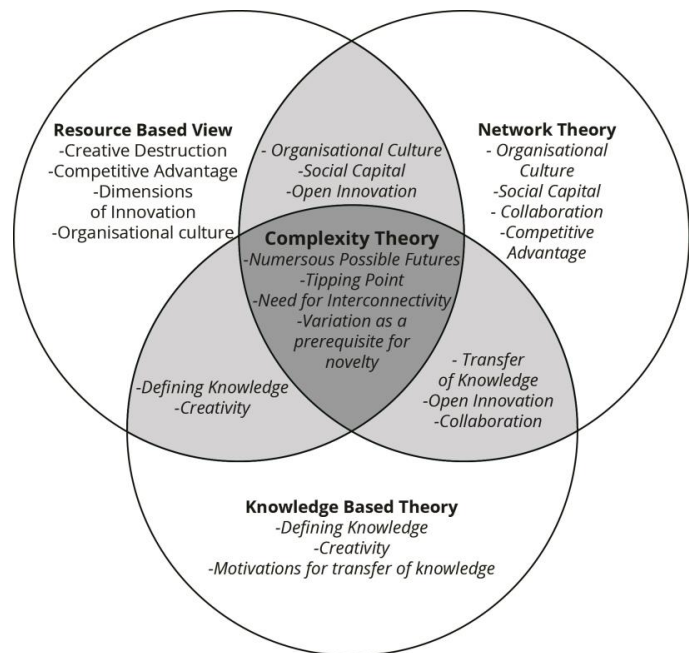


Figure 5 Complexity Theory Framework Model

implies that in lieu of IP protection, the benefits of knowledge sharing could be utilised and shared among their industry peers for the mutual benefit of close collaborators within their networks.

While not explicitly linked with the innovation literature, risk and, in particular risk aversion, was identified as a major barrier to innovation in firms. The conceptual framework model identifies complexity theory as a core theme of innovation, residing at the intersection of resource, network and knowledge based theories, as seen in figure five. Complexity theory contains elements which are difficult for a company to manage, thus leading to areas of risk aversion. Risk is a little studied area in relation to innovation and, if better understood, firms could manage more effectively their risk exposure and open themselves more readily up to future opportunities through innovation.

Overall, this thesis suggests areas of innovation practice that are in need of improvements at company level. The results indicate that knowledge management and knowledge sharing pose on-going challenges for companies. This issue is especially evident in relation to knowledge sharing and collaboration between companies and in lieu of traditional IP protection, knowledge could be shared more openly for the benefit of the company and its peers, thus increasing better knowledge flow between companies, and in turn, the organisational learning capabilities.

There is scope for greater collaboration between firms where it benefits both parties. For this to occur, companies need to be able to differentiate between collaborative and transactional relationships and manage this knowledge flow appropriately.

Finally, this thesis suggests further investigation into open knowledge sharing and more effective collaboration. However, most importantly, a larger and more in-depth investigation into firms risk profiles and appetite as well as their tendency toward aversion as related to innovation is an important area of future focus. Theoretical understanding needs to be further developed around risk management and innovation as well as practical support for firms to develop their own risk management capability. This support may need to come in the form of initiatives from higher governmental levels, providing support in addition to funding for SME's by way of government policies or the use of specialist government departments such as New Zealand Trade and Enterprise.

### 6.3. Limitations

There were several limitations to this study, the greatest of which was the extent and

complexity of the topic. Each of the aspects examined in the study warrant specific focused research yet none is independent of the complex environment within which firms are endeavouring to innovate. More particularly, the scope and study of each topic was limited by the overall limitations of the requirements for this Master's research thesis. There are three main areas of limitations.

Firstly, the sample selection was limited in both size and selection. Due to the time and cost limits imposed on the study, the interviewees were restricted to only eight companies, most of whom are involved in the high value manufacturing industry. It would be useful to examine a broader cross-section of companies across a range of sectors for wider capture and comparison of innovation culture and practices. This would provide a better picture of the patterns and themes relating to innovation in New Zealand. Furthermore, sampling only innovative companies presented a single-sided view on how companies innovate and collaborate where as a comparison study with both innovative and non-innovative companies would have provided a greater data set to derive comparisons from.

The first research question has scope for a quantitative study, by formulating a metric for creativity and innovative cultures. From a larger sample size, such metrics could be used to assess the actual level of innovation in New Zealand companies. This could contribute to addressing the limitation mentioned above by helping identify innovation levels for comparative purposes.

Because the issue of risk management within innovative businesses was not addressed in conjunction with innovation in the literature an opportunity arises for further integration of these two otherwise extensive literatures as well as to conduct empirical investigations focusing on this aspect of innovation.

Lastly, knowledge sharing in the absence of IP protection is an idealistic suggestion because companies have such a legacy of understanding on how ideas are their core competency and competitive advantage therefore the opinion remains that sharing their ideas for free puts their business at risk to being copied. IP protection in itself is a large area of study, and although it was included in this study in relation to codifying knowledge for greater sharing and collaboration, it was limited in its views. There is much more detail and depth to this area that could be applied to knowledge management when pertaining to innovation and collaboration.

#### **6.4. Future Research**

This section provides suggestions for further research that follow from the implications

of the findings and the limitations of this study. In particular, the small sample size means that the results of the study may not be representative of all innovating businesses in New Zealand and are therefore not generalisable, although they offer insights into barriers to innovation that are consistent with those reported elsewhere e.g. the *Powering Innovation* (MBIE, 2011) report. A larger cross-sectional study may yield further insights into the types of barriers that hinder the development of an innovation culture and limit innovation output in New Zealand companies.

Furthermore, an international study could be undertaken for comparative purposes between highly innovative countries identified in chapter one, e.g. Finland, Iceland, Israel and Australia to name but a few. Such studies could also develop and administer a metric for assessment of innovation culture as a benchmark for future studies.

Collaboration between firms and outside organisations needs to be studied further. The literature indicates that effective relationships in innovation are those which emphasise cooperative rather than transactional relationships. Further studies could verify and further analyse this area of interest using network theory perspectives and in particular open innovation practices.

Risk management in innovative firms is an important area for research which needs to be addressed further. It is known that innovation is the lifeblood of a company (Zahra & Covin, 1994), that a company's future relies on its ability to embrace new technology and techniques to innovate. The reliance on government money to assist in driving innovation is limiting for New Zealand firms, and could encourage a false belief that companies need financial assistance from government or other agencies in order to innovate at all. Risk management in relation to innovation and R&D needs to be studied in a wider sample size of small New Zealand companies. Identification of the levels and types of risk and how they are managed in small innovating businesses could be approached from a resource based view in the conceptual model and would add to a more in-depth overview of optimal creative destruction and innovation.

## 6.5. Final Words

Government policy and organisations can only support innovation so far, and as long as governmental resources are limited, their ultimate influence is going to be limited, leaving innovation largely remaining with companies themselves. In order to get New Zealand innovating and diversifying with the best of the best, the change has to come from the bottom up. Small businesses know that R&D is ultimately a profitable exercise so they must learn to innovate and be less risk adverse as well as learn that there are ways to manage and mitigate these risks or face the probability of being left behind.

As discussed in Chapter 2, the premise of complexity theory is that the future is a relatively unknown entity (Snowden, 2003.) This unknown future could be said to be the basis of all risk that inhibits innovation and growth in a company. Business strategy literature implies that companies should adopt a strategic view of complexity, and if companies learn to manage and embrace the unknown and better prepare themselves for innovation, by way of advanced knowledge management (Grant, 2013; Yang & Rui, 2009), integrative and best collaboration practices (Burt, 2007; Powell et al., 1996; Walker, Kogut, & Shan, 1997), as well as risk analysis and risk minimisation (Pérez-Luño, Wiklund, & Cabrera, 2011), it is possible for a company to be poised and ready for the future, even to the degree of reaching a possible tipping point (Snowden, 2003.)

Perhaps, most profoundly, with a detailed integrative and holistic strategic view, companies can place themselves in a competitive position where they can hold some degree of positional control in their respective value chain. Subsequently, through the use of advanced innovation practices of knowledge management, collaboration and risk management outlined in the findings of this thesis, these companies can place themselves in a position to influence and drive in the future of their respective industry.

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## Appendix A – Ethics approval



A U T E C  
S E C R E T A R I A T

29 July 2013

Coral Ingley

Faculty of Business and Law

Dear Coral

Re Ethics Application: **13/98 Measuring creative intelligence and the dissemination of knowledge as a driver for building an innovation culture in New Zealand businesses**

Thank you for providing evidence as requested, which satisfies the points raised by the AUT University Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 29 July 2016.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 29 July 2016;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 29 July 2016 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

All the very best with your research,

Kate O'Connor

Executive Secretary

**Auckland University of Technology Ethics Committee**

## Appendix B – Participant Information Sheet

Date Information Sheet Produced:

30 July 2013

### Project Title

Creative Intelligence and the Dissemination of Knowledge as a Driver for  
Building an Innovation Culture in New Zealand Businesses

### An Invitation

Dear Participant,

My name is David Michau, and I would like to extend an invitation to you to participate in an interview as part of my Master of Business research Project at AUT University. My research is focused on innovation practices and knowledge among New Zealand organisations.

The hopeful outcome of this research is to gain insight into, and a better understanding of, innovation practices, cultures, and how companies disseminate innovation knowledge throughout their own company and/or between other companies and peers.

I hope that you will agree to take part in an interview to share your knowledge and experience on this key topic. However, your participation in this research is totally voluntary and if you agree to be interviewed you have the right to withdraw from the interview at any time for any reason prior to the completion of data collection. To give you time to think about this invitation, I will contact you in one week's time for your decision about participating in an interview.

### What is the purpose of this research?

This research is designed to fulfil a gap in the knowledge of innovation practices throughout New Zealand Businesses. It will also fulfil the final step in completing my Masters of Business degree at AUT University.

### How was I identified and why am I being invited to participate in this research?

This research project was designed to gather data from two differing sources to provide a dataset from which to compare against each other.

One of the main criteria for selection as a potential participant was recent acknowledgement of your innovation practice within the last 2 years. Your organisation has been awarded or nominated for awards or has had media attention sufficient to warrant yourselves as an innovative organisation.

The other criterion for selection was an organisation that is not known to be innovative, nor promote innovative practices. This criterion is designed to gather comparative data that will aid in identifying missing links and issues in current innovation practices.

Your company has been selected according to the above criteria, and you as have been identified as a key informant holding a management/senior position directly involved in or related to the innovation and/or development or engineering team in your company.

### **What will happen in this research?**

This project involves semi-structured interviews with participants, which are estimated to take approximately 45 minutes to an hour. During the interview, notes will be taken by myself, and the whole interview is to be audio recorded, with your permission, for later transcription and detailed analysis.

Questions asked will be related to your organisations innovation practices and methods. Such aspects as your companies methods and techniques for innovation, product development and R&D, as well as employees' levels of tacit and explicit knowledge, the company's number of innovations rolled out in the previous year and company's orientation to change will be explored.

### **What are the discomforts and risks?**

There should be no discomforts or risk throughout the interview process. Questions and conversations will be directed towards the company, its practices and methods, not the individual/participant.

### **How will these discomforts and risks be alleviated?**

Any risks pertaining to the company, its practices and methods will be managed by way of signed confidentiality agreements between myself as the interviewer and the participants as detailed below in the privacy section.

### **How will my privacy be protected?**

Because I am reliant on your views and opinions for the success of this research maintaining your confidentiality is of the utmost importance to me.

Under no circumstances will the information presented during the interview be attributed to any one individual in reporting the results. The organisation will not be identified in the final report, your name and title will be kept confidential, and you will be given the opportunity to check over transcripts from the interviews for any sensitive commercial information. However, the interview questions will be general in nature and will not seek specific commercial information that may be sensitive. Nevertheless you will be able to edit and remove any information in the transcript which you do not want to be disclosed.

Interview recordings and transcripts will be kept in a locked cabinet and under password on a computer, and will be destroyed one year from the conclusion of the research. The research findings may be published in the AUT University library and excerpts may be included in academic publications.

### **What are the benefits?**

This research is part of a thesis on innovation in New Zealand and will contribute to my final Masters Qualification. It also aims to gain insight into and contribute towards successful innovation methods and practices throughout New Zealand. The final report will be available to participants, and will be of high interest and/or use to policy makers as well as individuals and/or companies involved in innovation in New Zealand.

### **What are the costs of participating in this research?**

The entire process should not take more than 2 hours of your time including the interview (approximately 1 hour) and any correspondence leading up to and after the interview.

No travel will be required as the interview will be conducted at a location of your choice and at a time and date convenient to you.

**What opportunity do I have to consider this invitation?**

Interviews will be planned for the middle of July, 2013.

You will have 2 weeks to decide upon participation, after which I will follow up with a phone call to confirm participation. Arrangement of interview time(s) will be made via email or phone, for a time most suitable to you.

**How do I agree to participate in this research?**

If you agree to participate in this research, please complete and return the attached consent form.

Alternatively, I am happy to forward a digital copy for you to sign electronically and email back if this is more convenient.

**Will I receive feedback on the results of this research?**

The final report will be posted online and a link directing you to the report will be supplied upon its completion. Alternatively, the report can be sent to you via email, and/or post if requested.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Coral Ingley, [coral.ingley@aut.ac.nz](mailto:coral.ingley@aut.ac.nz), +64 9 921 9999 ext 5419

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEK, Kate O'Connor, [koconnor@aut.ac.nz](mailto:koconnor@aut.ac.nz), +64 9 921 9999 ext 6902.

**Whom do I contact for further information about this research?**

**Researcher Contact Details:**

David Michau, [davidmichau@gmail.com](mailto:davidmichau@gmail.com), 021 614 354

**Project Supervisor Contact Details:**

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## Appendix C - Indicative Interview Questions

*Project title: Measuring Creative Intelligence and the Dissemination of Knowledge as a Driver for Building an Innovation Culture in New Zealand Businesses*

*Project Supervisor: Dr. Coral Ingley*

*Researcher: David Michau*

### Introduction/overarching Questions

- ⤴ On a scale of 1-10 1 being non-innovative and 10 being Apple. How innovative do you think your company is?
- ⤴ Does your company have an explicit innovation R&D strategy? Budget? In a percentage how much does the company spend/ focus on innovation and R&D?
- ⤴ Can you describe some of your company's basic innovation processes?
- ⤴ Are there any notable successful methods and/or facilitators towards driving innovation within your organisation that have proven successful? Perhaps on a regular basis?
- ⤴ Has your company suffered (present or past) from any disruptive innovations entering into the market and leaving your company behind on any of your product or service lines? (eg, ipods replacing CD's or social media replacing newspapers/magazines)

### Innovation Knowledge – Tangent/Explicit. IP. Sharing. Dissemination

- ⤴ There are several ways to measure innovation, through IP, Patents, new products or services brought to market. Does your company hold and maintain any sort of formal IP, idea or other knowledge system?
- ⤴ Do you bring in outside companies, consultants or designers to assist with your innovation or R&D efforts?

### Innovation Management

- ⤴ Who ultimately makes the calls in regards to your R&D efforts? Be it budgets, resources, tasks and goals.

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- ⤴ Do you perceive any notable issues in your R&D processes that need addressing, be it improving or completely overhauling? If so, how do you feel these could be addressed?
- ⤴ Risk mitigation is known to hinder innovation in organisations. Particularly those that are heavily siloed. Do you have this issue in your organisation and if so can you give some examples?
- ⤴ What are your biggest hurdles and challenges during the innovation / R&D process?  
This also extends to staff management and innovation practices company wide.
- ⤴ Do you have any other perceived barriers to successful innovation?

### **Open Innovation Practices**

- ⤴ What does your company do to encourage innovation and drive an innovative culture through the company?
- ⤴ In your opinion, how encouraged are employees to innovate and develop on a regular basis? Is there any training or facilitation for this?
- ⤴ And is everyone encouraged to innovate? From all levels and areas of the business.
- ⤴ Does your company collaborate with outside organisations when innovating?
- ⤴ If so how much, and how do you come across identifying and maintaining these relationships? Also, without identifying who, what type of organisations are you collaborating with and how often?
- ⤴ Does your company actively share and or seek knowledge in the innovation and R&D areas?

### **Need for national innovation strategy, networks.**

- ⤴ Are you aware of the governments programs for innovation and R&D over the last 2 years through the Ministry of Business, Innovation and Education? Does

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your company have scope and interest in begin involved in any such programs and grants, by MBIE or any other organisation?

**Ending Notes, other questions**