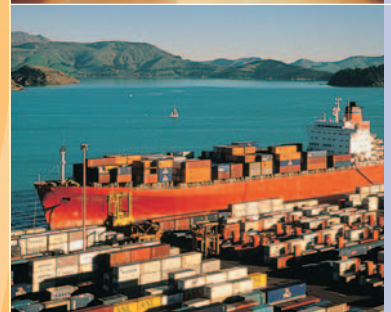




# An International Comparison of Models of Innovation and their Implications for New Zealand

Tiffany A. Rinne  
John Fairweather

Research Report No. 323  
August 2011



CHRISTCHURCH  
NEW ZEALAND  
[www.lincoln.ac.nz](http://www.lincoln.ac.nz)



**Lincoln**  
**University**  
*Te Whare Wānaka o Aoraki*

**Research to improve decisions and outcomes in agribusiness, resource,  
environmental and social issues.**

The Agribusiness and Economics Research Unit (AERU) operates from Lincoln University, providing research expertise for a wide range of organisations. AERU research focuses on agribusiness, resource, environment and social issues.

Founded as the Agricultural Economics Research Unit in 1962 the AERU has evolved to become an independent, major source of business and economic research expertise.

The Agribusiness and Economics Research Unit (AERU) has four main areas of focus. These areas are trade and environment; economic development; non-market valuation; and social research.

Research clients include Government Departments, both within New Zealand and from other countries, international agencies, New Zealand companies and organisations, farmers and other individuals.

**DISCLAIMER**

---

While every effort has been made to ensure that the information herein is accurate, the AERU does not accept any liability for error of fact or opinion which may be present, nor for the consequences of any decision based on this information.

A summary of AERU Research Reports, beginning with number 235, is available at the AERU website <http://www.lincoln.ac.nz/aeru>.

Printed copies of AERU Research Reports are available from the Secretary.

Information contained in AERU Research Reports may be reproduced, providing credit is given and a copy of the reproduced text is sent to the AERU.

# **An International Comparison of Models of Innovation and their Implications for New Zealand**

**Rinne, Tiffany A.  
Fairweather, John**

**Research Report No. 323**

**August, 2011**

**Agribusiness and Economics Research Unit  
P O Box 84  
Lincoln University  
Lincoln 7647  
Christchurch  
New Zealand**

**Ph: (64) (3) 321 8280**

**Fax: (64) (3) 325 3679**

**<http://www.lincoln.ac.nz/AERU/>**

**ISSN 1170-7682 (Print)  
ISSN 2230-3197 (Online)  
ISBN 978-1-877519-19-2**



# Contents

<b>LIST OF TABLES</b>	<b>i</b>
<b>LIST OF FIGURES</b>	<b>i</b>
<b>ACKNOWLEDGMENTS</b>	<b>iii</b>
<b>PREFACE</b>	<b>v</b>
<b>SUMMARY</b>	<b>vii</b>
<b>CHAPTER 1 INTRODUCTION: RESEARCH OBJECTIVES AND LITERATURE REVIEW</b>	<b>1</b>
1.1 Introduction	1
1.2 Literature review	1
1.3 Outline of report	2
<b>CHAPTER 2 METHODS</b>	<b>3</b>
2.1 Introduction	3
2.2 Country selection	3
2.3 Computer-assisted Interviews conducted by TUI team member	4
2.4 Online surveys	5
2.5 Data analysis	6
2.6 The potential to generalise from the samples	7
<b>CHAPTER 3 BACKGROUND OF THE COUNTRIES UNDER INVESTIGATION</b>	<b>9</b>
3.1 Introduction	9
3.2 Background information for New Zealand	9
3.3 Background information for Australia	10
3.4 Background information for Austria	12
3.5 Background information for the Czech Republic	13
3.6 Background information for Denmark	15
3.7 Background information for Estonia	16
3.8 Background Information for Finland	17
3.9 Background information for Korea	19
3.10 Background information for Slovenia	20
3.11 Background Information for Sweden	21
<b>CHAPTER 4 INNOVATION MODELS: QUALITATIVE DATA</b>	<b>23</b>
4.1 Introduction	23
4.2 New Zealand innovation model	23
4.3 Australia innovation model	24
4.4 Austria innovation model	25
4.5 Czech innovation model	26
4.6 Denmark innovation model	27
4.7 Estonia innovation model	28
4.8 Finland innovation model	29
4.9 South Korea innovation model	30
4.10 Slovenia innovation model	32
4.11 Sweden innovation model	33
<b>CHAPTER 5 INNOVATION MODELS: QUANTITATIVE DATA</b>	<b>35</b>
5.1 Introduction	35
5.2 Counts by category	35

5.4	A focus on New Zealand	38
<b>CHAPTER 6</b>	<b>CONCLUSION</b>	<b>41</b>
6.1	Introduction	41
6.2	Summary of key results	41
6.3	Discussion of results	42
6.4	Policy implications	43
6.5	Future research	43
<b>REFERENCES</b>		<b>45</b>
<b>APPENDIX 1</b>	<b>OPEN-ENDED QUESTIONS FOR COMPUTER-ASSISTED SURVEY</b>	<b>47</b>
<b>APPENDIX 2</b>	<b>OPEN-ENDED QUESTIONS FOR QUALTRICS SURVEY</b>	<b>51</b>

## List of Tables

Table 2.1: Countries included in the sample	4
Table 2.2: Demographic information for computer-assisted interview sample	5
Table 2.3: Demographic Information for Qualtrics samples	6
Table 5.1: Prominent industries by country	35
Table 5.2: Beliefs about innovation by country	36
Table 5.3: Limits to innovation by country	36
Table 5.4: Reasons for innovation success by country	37
Table 5.5: Prominent figures in innovation by country	37
Table 5.6: Prominent innovative companies by country	38
Table 5.7: New Zealand innovation identity elements shared by other countries	39

## List of Figures

Figure 4.1: New Zealand innovation identity	23
Figure 4.2: Australian innovation identity	24
Figure 4.3: Austrian innovation identity	25
Figure 4.4: Czech innovation identity	26
Figure 4.5: Danish innovation identity	27
Figure 4.6: Estonian innovation identity	28
Figure 4.7: Finnish innovation identity	29
Figure 4.8: South Korean innovation identity	30
Figure 4.9: Slovenian innovation identity	32
Figure 4.10: Swedish innovation model	33



## **Acknowledgments**

Funding for the research reported here was provide by the New Zealand Foundation for Research, Science and Technology, under contract number LINX 0801.



## Preface

A focus on overseas markets has been an important topic for AERU research for many years, reflecting the importance of paying attention to the destination of many of our exports. This focus has been used to address a variety of issues with a view to improving our export returns. Typically, this research has included research into high tech, medical technologies and especially agribusiness. This includes willingness to pay for products with particular attributes, and culminates in our trade modelling work. However, there has also been interest in a broad range of issues relating to New Zealand market destinations, such as access into Chinese, US and European markets, to mention a few, and country policies. This report is part of that tradition of learning about, and from, the characteristics of New Zealand's overseas markets, and it gives attention to cultural values and how these can be formed into models of innovation. This report will be of interest to those wishing to learn about the innovation characteristics of the countries studied and, in addition, learn about how innovation in New Zealand stands in comparison to these countries.

**Prof. Caroline Saunders**  
**Director**



# Summary

## **Conclusion:**

The research showed little evidence that governmental initiatives seeking to promote innovation as a part of New Zealand national identity were actually embedding the idea into the public's consciousness.

## **Background and rationale:**

Part of the Technology Users' Research Programme required determining what is distinctive about innovation in New Zealand. The main rationale for this research was to provide a basis for comparison across nations in order to better understand the uniqueness of New Zealand's innovation situation.

## **Research objectives:**

The objective of the research was to devise cultural models of innovation identity for selected countries in Europe, Asia and Australasia.

## **Method:**

Data were obtained from New Zealand, Australia, Austria, Czech Republic, Denmark, Estonia, Finland, South Korea, Slovenia and Sweden using either computer-assisted self-interviewing or an internet survey. The questionnaire responses from open-ended questions were analysed both qualitatively and quantitatively.

## **Results:**

Comparing the models of innovation identity showed that:

- Australia has a similar innovation identity compared to New Zealand, but it appears to be healthier. Further, respondents recognized CSIRO, a government sponsored innovation institution as being an innovative Australian company unlike the Crown Research Institutes within New Zealand.
- Compared to most other countries, New Zealand respondents did not appreciate that education was important for innovation success.
- Some countries (Denmark and Sweden) are already recognised as environmental nations with environmental-type innovations. This suggests that New Zealand, a nation with a clean, green national identity, has potential to also achieve similar recognition with respect to environmental-type innovations.
- New Zealanders see innovation as a way to keep up with the world while many other countries see innovation as a way to get noticed or to achieve world recognition.
- Comparisons to Finland show that lacking a history of science and being small are not insurmountable barriers to being innovative, and comparisons to South Korea suggest that economic policy can be effective in bringing about change in innovation in a short period of time.
- Comparisons to Slovenia suggest that sport technologies may have the potential to be the basis of a significant export industry.



# Chapter 1

## Introduction: Research Objectives and Literature Review

### 1.1 Introduction

Recent research in the AERU has focussed on the study of technology users' innovation (TUI). The primary objective of the research was to identify the conditions under which socio-technical networks best foster technology development, adoption and commercialisation, in order to contribute to improved innovation outcomes and innovation governance in New Zealand. The research aim was to increase our fundamental knowledge of (1) technology users as a source of innovation, (2) how socio-technical networks work to help or hinder innovation, (3) the unique technology governance factors in New Zealand and (4) the distinctive cultural qualities of New Zealand innovation.

A secondary objective of the programme was to understand New Zealand's distinctive culture of innovation by making comparisons with other countries. The research goal was to devise cultural models of national identity, culture and innovation for selected countries. This report focuses on cross-cultural comparison of innovation identity. Through comparison with other nations, one can come to better understand the uniqueness of New Zealand's innovation situation.

We define innovation identity as the images individuals have of their nation with respect to innovation. As we will discuss in the methods chapter, due to the nature of our sampling and the limited number of questions asked we focused on six main areas of innovation identity: industries, attitudes toward innovation, limits to innovation, reasons for success, prominent figures and prominent companies.

In this chapter we will briefly review the literature linking innovation identity to culture, and highlight one study linking innovation to national identity in New Zealand.

### 1.2 Literature review

A review of the international literature found very little prior research on national-level innovation identity. We did, however, find literature on innovation and culture. As this literature is only peripherally related to the focus of this report, it is briefly mentioned, giving references for those who wish to explore the literature further. This literature on culture and innovation covered three main areas: 1. culture and its relationship to the uptake of technology (see for example Hasan and Ditsa, 1999, Herbig and Miller 1992), 2. organizational culture at the corporate level and its relationship to company innovation (see for example, Schein, 1992 and Schoenberger, 1994), 3. regional differences in innovation culture (see for example James, 2005 and Saxenian, 1994).

The limited amount of literature on innovation as a component of national identity included one article by Skilling (2010) which specifically focuses on innovation as a part of New Zealand's national identity. As one of our designated research foci is New Zealand innovation, we will briefly review this article.

When the Labour Party came to power in 1999 as head of a coalition government, the defence and promotion of national identity became a central focus of the party's agenda. According to Skilling (2010), the focus of national identity was fundamentally shaped by the government's desire for economic competitiveness. The official government narrative regarding national identity for New

Zealand was openness, diversity and tolerance. Skilling (2010) contends, however, that the focus was really much narrower: creativity, flexibility and innovation. “Labour’s construction of a shared purpose and a common identity was fundamentally shaped by a notion of economic competitiveness” (Skilling, 2010, pg. 176). According to Turner (2005), New Zealand has always had one eye on global markets, investors and migrants as a result of the nation’s physical location and economic structure. The Labour government argued that international perceptions of New Zealand were outdated and there needed to be more awareness of New Zealand as an innovative country. In order to compete in the ‘race to the future’ of globalisation, innovation as a part of national identity was deemed necessary.

Skilling’s article shows how important innovation is considered to be for national-level success and highlights the potential importance of innovation as a part of national identity in general, and New Zealand national identity in particular.

When we later review the innovation identity model for New Zealand, we will be in a position to assess the effectiveness of the government’s focus on innovation. Did the rhetoric about innovation and economic growth translate into widespread acceptance of innovation as part of New Zealand’s national identity?

### **1.3 Outline of report**

In Chapter 2, the reasons for selecting our case study countries will be discussed as well as our methods of data collection and analysis. In Chapter 3 we will provide important background information for each of our case study countries including important historical and economic information. In Chapter 4 we will present our models of innovation identity and qualitatively assess what New Zealand can learn from each model. This will be followed by a quantitative comparison of the models in Chapter 5. Conclusions and areas of further research will be discussed briefly in Chapter 6.

# Chapter 2

## Methods

### 2.1 Introduction

This chapter describes the countries selected for study. It then explains how each country was surveyed. Surveying in foreign countries can raise problems not usually encountered while surveying in one's home country, and this chapter explains how we had to adapt our methods to suit the conditions we encountered in each country.

### 2.2 Country selection

A wide range of case-study countries were considered for study. Our early thinking suggested that suitable case-study countries for comparison with New Zealand were those with similarity to New Zealand by virtue of being relatively small, open economies and at some distance from the major markets. Upon further thought additional criteria were added. A more implicit criterion "quality of innovation policies" was used in the selection of a subset of the case-study countries: Austria, Finland, Denmark and Sweden. These countries have a long history of innovation policies and have good availability of policy intelligence in the form of monitoring, analysis and evaluation. Further, some countries were chosen because they are considered 'developing' and have parallels with New Zealand in this regard. Finally, location in the Pacific Rim was another factor used in case-study country selection. Several small but highly innovative Asian nations were selected for inclusion in the study as well as Australia which shares a similar cultural heritage, namely European, with New Zealand.

The list of selected countries is shown in Table 2.1. The table shows the rating of each country in terms of its innovation developmental stage according to PRO INNO Europe (2009). The four categories are: Leader, Follower, Moderate, and Moderate in Transition. This rating system is only available for European nations. The table also shows two international innovation ratings for each country. The first rating is the Global Innovation Index (GII) (INSEAD 2010) ranking and the second is the International Innovation Index (III) ranking (Andrew et al. 2009). The GII and III represent large-scale indices for comparison of innovation performance taking into account numerous factors influencing innovation. For a more in-depth discussion of these indices please see the literature.

**Table 2.1: Countries included in the sample**

Location	Country	Rating of development stage of innovation system*	GII Score	III Score
Europe	Denmark	Leader	8	11
	Finland	Leader	11	7
	Sweden	Leader	4	10
	Austria	Follower	22	17
	Czech Republic	Moderate in transition	27	32
	Estonia	Moderate in transition	41	23
	Slovenia	Moderate in transition	29	33
Asia	South Korea		14	2
Australasia	Australia		20	22
	New Zealand		9 (previous year 27)	26
	<b>Total</b>	10		

### 2.3 Computer-assisted Interviews conducted by TUI team member

The initial goal of the TUI programme was to travel to each of the countries of interest and administer computer-assisted self-interviews (CASI). This method had proven effective in New Zealand and formed the basis of a detailed study of New Zealand cultural, national and innovation identities (Rinne and Fairweather, in press).

Local high schools in Austria, Estonia, Slovenia, Sweden, Finland and the Czech Republic were approached. Schools were offered 500 Euro in exchange for soliciting 20 adult volunteers and providing a venue. We chose schools from the middle income bracket in the capital cities of each nation. Schools were contacted via e-mail as well as by phone, and representatives involved with fundraising were sought. The school representative was asked to source prospective participants, an equal number of men and women if possible, from people involved with the school or who lived in the local area.

The qualitative interview portion of our research took on average one and half hours and was scheduled in advance at a designated time and place (namely onsite at the schools) and outside of normal daily activities. The researcher clarified the purpose of the interview and explained that participants would be asked questions about three domains: culture, national identity and innovation for their country. Participants were assured that there were no right or wrong answers to any of the questions and we asked that they speak freely about their beliefs and opinions.

A total of 42 open ended questions were asked along with a set of demographic questions. For each domain of interest we asked a number of questions. The questionnaire can be found in Appendix 1. It should be noted that sufficient data for analysis were obtained only for Estonia, Slovenia and the Czech Republic. It should also be noted that the Czech sample is comprised of two sets of data. One set, consisting of 11 respondents, was collected in-country via computer-assisted interviewing where an interviewer was present. The other set of data, consisting of 20 Czech respondents, was collected via e-mail in order to reach a useable sample size. The second set of Czech data was based on the same shortened interview given to Qualtrics respondents (Appendix 2). Table 2.2 shows the demographic information for the three countries for which sufficient data were obtained.

The Estonia interviews were given in English and respondents answered in English. The Slovenian interviews were translated to Slovenian and respondents answered in their own language. The completed interviews were then translated to English. The first set of Czech interviews was in English and respondents answered in both English and Czech, depending on their level of comfort with English. The second set, via e-mail, was translated to Czech and respondents answered in their own language. The completed interviews were then translated to English.

**Table 2.2: Demographic information for computer-assisted interview sample**

	<b>Slovenia (n=19)</b>	<b>Estonia (n=15)</b>	<b>Czech Republic (1<sup>st</sup> set interviews) (n=11)</b>	<b>Czech Republic (2<sup>nd</sup> set of interviews) (n=20)</b>
<b>Gender</b>				
Male	6	1	1	6
Female	13	14	9	14
<b>Age</b>				
20-29				
30-39	3	9	2	5
40-49	10	4	8	10
>50	6	2		5
<b>Education</b>				
University Degree	17	15	5	18
Trade/Vocational/Technical				1
Upper High School	1		3	1
Lower High School	1			
Less than High School			2	

## 2.4 Online surveys

Finding schools and respondents willing to participate in a computer-assisted interview with an interviewer present proved to be more difficult than imagined. Computer-assisted interview times were set up for schools in Finland, Sweden, Denmark and Austria but due to various events (no shows, lack of access to computers etc.) insufficient data were obtained. Even those schools able to source an adequate number of respondents were not able to obtain an equal number of men and women. We decided, therefore, to engage a survey company to source respondents for an online survey. Our chosen company was Qualtrics. In this way we could obtain a larger sample size as well as even out the gender ratio of respondents. Online surveying requires that respondents can complete the questionnaire within 20 to 30 minutes. Accordingly, we shortened our questionnaire for the Qualtrics survey.

Qualtrics was used to survey respondents from the European countries for which our first approach did not work: Denmark, Finland, Sweden, and Austria. In addition, we extended the Qualtrics survey to include South Korea and Australia. We tried to include other Asian countries, such as Singapore, Malaysia and Taiwan but Qualtrics was unable to provide access to these nations. Finally, in order to ensure that our overseas data was compatible with New Zealand data, by virtue of being derived from the same identical shortened questionnaire, we included New Zealand in the Qualtrics survey<sup>1</sup>.

<sup>1</sup> We compared the New Zealand data derived from the Qualtrics internet survey with the data from the CASI data and found that the results were broadly similar although far less in-depth.

Qualtrics solicited volunteers from each country to fill out a questionnaire consisting of 18 open-ended questions about culture, national identity and innovation identity as well as nine demographic questions. Respondents were also asked a series of Likert-type questions but these questions were not used to formulate respondent models of innovation and are thus not discussed here. The questionnaire can be found in Appendix 2.

With internet surveying it is not possible to obtain a random sample since there is no known population list from which to draw a sample. As an alternative to such random sampling we turned to quota sampling (Blalock, 1972), a form of non probability sampling, in which cases are selected to meet certain criteria. We requested that the samples include: 1. at least 20 respondents from each of two different age groups (20 to 40 years old and more than 40 years old), 2. equal numbers of men and women, and 3. that respondents be citizens of the nation. In the end, we often obtained from Qualtrics more responses than the initial 40 targeted, in many cases obtaining over 100 useable responses. Table 2.3 shows the demographic breakdown of our samples. It should be noted that Qualtrics was not always able to provide us with the age distribution and gender distributions we requested although each sample represents a wide range of ages and at least 20 males responded to the survey in each country.

The questionnaires were translated from English into the appropriate language for each country, and all respondents had a choice between responding in English or in their native language. It was estimated that the questionnaire would take respondents approximately 30 minutes to complete on average.

**Table 2.3: Demographic Information for Qualtrics samples**

	New Zealand (n=108)	Australia (n=101)	Austria (n=71)	Denmark (n=38)	Finland (n=90)	Sweden (n=164)	South Korea (n=40)
<b>Gender</b>							
Male	36	41	21	24	44	54	20
Female	72	60	50	14	46	110	20
<b>Age</b>							
20-29	14	28	40	23	50	39	6
30-39	37	25	25	10	30	29	15
40-49	30	9	6	3	10	59	14
>50	27	37	0	2	0	37	5
<b>Education</b>							
University Degree	57	43	23	13	19	70	36
Trade/Vocational/Technical	26	36	17	10	23	23	0
Upper High School			28	12	20	59	
Lower High School	23	21	3	1	20	10	4
Less than High School	2	1	0	2	8	2	0

## 2.5 Data analysis

Our original research intention when we started with the CASI interviews was to build what an anthropologist would call a cognitive cultural model. Cultural modelling is a qualitative method based on discourse analysis. Cultural models are those presupposed, taken-for-granted models of

knowledge and thought that are used in the course of everyday life to guide a person's understanding of the world and their behaviour (D'Andrade 1984). According to Blount (2002:9), to create a cultural model from respondent discourse:

One works 'backwards,' asking questions about how the text was created, in effect asking what the conceptualizations are upon which the text is based. The conceptualizations are the raw materials of the analysis. They reflect the agent's underlying mental models, the framework with which the world is engaged. The reconstructed mental models of an individual constitute the cognitive architecture upon which the discourse is generated.

However, in order to obtain much of our international data, we had to shorten our questionnaire to such a degree that cultural modelling was no longer possible. The shortened questionnaire consisted of just 18 open-ended questions making it impossible to serialize, embed and hierarchically organize people's beliefs into a cognitive cultural model. There was insufficient raw discourse for such an endeavour.

Instead, we analyzed the available discourse and sorted the items relevant to innovation identity into six key identity areas. The areas of innovation identity were: industries, attitudes toward innovation, limits to innovation, reasons for success, prominent figures and prominent companies. Because of the limited number of questions posed, we focused on assessing these six main areas of innovation identity. It should be noted, however, that these six areas are by no means the only aspects of national-level innovation identity that potentially exist. A more in-depth study might reveal more. While not as detailed as, nor showing the connections that would be present in a cognitive cultural model, the resulting models of innovation identity still provide valuable information about innovation identity and allow for some comparisons to be made between nations.

## **2.6 The potential to generalise from the samples**

The Qualtrics internet survey method provided a cost effective means of obtaining a sample of respondents from each of our countries of interest. However, the quota sampling resulted in relatively small, non-random samples for each of the countries studied. An important issue is determining if generalisation to the population is possible from these samples.

It is customary in social research methods to think that generalisation is only possible when random samples are used. Gobo (2009) has argued persuasively that this position is wrong. We have built on Gobo's position to argue that there are credible bases for making generalisations from results when such samples are not used which is typically the case for qualitative research (Fairweather and Rinne, 2012). These bases include using emblematic cases with a focus on identifying the key structural features of which the cases are made up and which are found in other cases of the same class. In this study of innovation models, we have sought to identify the shared common elements of innovation identity across the cases in our samples. Because they are shared elements we are confident that they would also be found in other people for that particular country. There are, therefore, good grounds for believing that the use of these quota samples in this qualitative research can be used to generalise the results to the population.



## **Chapter 3**

### **Background of the Countries Under Investigation**

#### **3.1 Introduction**

As not all readers will be familiar with each of the countries included in our analysis, we provide important background information for each nation in this chapter. This information will help set the stage for a better understanding of each nation's innovation identity model presented in the subsequent chapter. All the information presented in this chapter was taken from the CIA World Factbook (2011) in order that the coverage across nations be comparable in content, depth and source.

#### **3.2 Background information for New Zealand**

##### **Background in brief**

The Polynesian Maori reached New Zealand in about A.D. 800. In 1840, their chieftains entered into a compact with Britain, the Treaty of Waitangi, in which they ceded sovereignty to Queen Victoria while retaining territorial rights. In that same year, the British began the first organized colonial settlement. A series of land wars between 1843 and 1872 ended with the defeat of the native peoples. The British colony of New Zealand became an independent dominion in 1907 and supported the UK militarily in both world wars. New Zealand's full participation in a number of defense alliances lapsed by the 1980s. In recent years, the government has sought to address longstanding Maori grievances.

##### **Geography**

New Zealand is located in the South Pacific Ocean, southeast of Australia. The total land area for New Zealand is 267,710 sq km and it is the approximate size of Colorado. The climate is temperate with sharp regional contrasts. The terrain is primarily mountainous with large coastal plains.

##### **People**

New Zealand ranks 125<sup>th</sup> in the world in population size with approximately 4.3 million people. Eighty six per cent of the population live in urban areas. New Zealand's major cities are Auckland with 1.36 million people and Wellington with 391,000. European is the dominant ethnic group with 56.8 per cent of the population of European descent. Asians comprise 8 per cent of the population, Maori 7.4 per cent, and Pacific islanders 4.6 per cent. The literacy rate in New Zealand is 99 per cent, school life expectancy (primary to tertiary education) is 19 years and national education expenditures as of (2007) were at 6.2 per cent of GDP (world rank 33).

##### **Government**

The New Zealand government is a parliamentary democracy and a Commonwealth realm. New Zealand gained its independence from the United Kingdom on 26 September 1907.

##### **Economy**

Over the past 20 years the government has transformed New Zealand from an agrarian economy dependent on concessionary British market access to a more industrialized, free market economy that can compete globally. This dynamic growth has boosted real incomes - but left behind some at the bottom of the ladder - and broadened and deepened the technological capabilities of the

industrial sector. Per capita income rose for ten consecutive years until 2007 in purchasing power parity terms, but fell in 2008-09. Debt-driven consumer spending drove robust growth in the first half of the decade, helping fuel a large balance of payments deficit that posed a challenge for economic managers. Inflationary pressures caused the central bank to raise its key rate steadily from January 2004 until it was among the highest in the OECD in 2007-08; international capital inflows attracted to the high rates further strengthened the currency and housing market, however, aggravating the current account deficit. The economy fell into recession before the start of the global financial crisis and contracted for five consecutive quarters in 2008-09. In line with global peers, the central bank cut interest rates aggressively and the government developed fiscal stimulus measures. The economy posted a 1.7 per cent decline in 2009, but pulled out of recession late in the year, and achieved 2.1 per cent growth in 2010. Nevertheless, key trade sectors remain vulnerable to weak external demand. The government plans to raise productivity growth and develop infrastructure, while reining in government spending.

The 2010 estimate of GDP was 119.2 billion (USD) ranking New Zealand as 63<sup>rd</sup> in the world. The GDP growth rate is estimated to be 2.1 per cent ranking New Zealand as 148<sup>th</sup> in the world. The per capita GDP in New Zealand is \$28,000 USD ranking New Zealand as 51<sup>st</sup> in the world. The GDP composition by sector is agriculture (4.6 per cent), industry (24 per cent) and services (71.4 per cent).

The primary agricultural products produced in New Zealand include dairy products, lamb and mutton, wheat, barley, potatoes, pulses, fruits, vegetables, wool, beef and fish. New Zealand's primary industries are food processing, wood and paper products, textiles, machinery, transportation equipment, banking and insurance, tourism and mining. New Zealand's primary exports are dairy products, meat, wood and wood products, fish and machinery. Exports account for \$33.24 billion USD (rank 62<sup>nd</sup> in the world). Imports include machinery and equipment, vehicles and aircraft, petroleum, electronics, textiles, and plastics. Imports account for \$30.24 billion USD (rank 58<sup>th</sup> in the world).

The telephone system, both domestic and international, in New Zealand can be characterized as excellent. Television New Zealand operates multiple television networks and cable/satellite TV are available. New Zealand has 2.47 million (2010) internet hosts ranking it 33<sup>rd</sup> in the world. As of 2009 there are an estimated 3.4 million internet users, ranking New Zealand 62<sup>nd</sup> in the world.

### **3.3 Background information for Australia**

#### **Background in brief**

Aboriginal settlers arrived on the continent from Southeast Asia about 40,000 years before the first Europeans began exploration in the 17th century. No formal territorial claims were made until 1770, when Capt. James COOK took possession of the east coast in the name of Great Britain (all of Australia was claimed as British territory in 1829 with the creation of the colony of Western Australia). Six colonies were created in the late 18th and 19th centuries; they federated and became the Commonwealth of Australia in 1901. The new country took advantage of its natural resources to rapidly develop agricultural and manufacturing industries and to make a major contribution to the British effort in World Wars I and II. In recent decades, Australia has transformed itself into an internationally competitive, advanced market economy. It boasted one of the OECD's fastest growing economies during the 1990s, a performance due in large part to economic reforms adopted in the 1980s. Long-term concerns include ageing of the population, pressure on infrastructure, and environmental issues such as frequent droughts.

## **Geography**

Australia is a continent located between the Indian and South Pacific Oceans. The total land area is 7, 741,220 sq km, making Australia the 6<sup>th</sup> largest country in the world. Australia is only slightly smaller than the 48 contiguous US states. Australia's climate is generally arid to semiarid, temperate in the south and east and tropical in the northern region. There is a fertile plain in the southeast but Australia is mostly comprised of low plateaus with deserts.

## **People**

The estimated population of Australia is 21,766,711 as of July 2011, ranking Australia as the 55<sup>th</sup> most populous country in the world. 89 per cent of the population lives in urban areas. Major cities include Sydney (4.49 million), Melbourne (3.853 million), Brisbane (1.97 million), Perth (1.599 million) and Canberra the capital (384,000). The main Australian ethnic groups are whites (92 per cent), Asians (7 per cent) and aboriginal and other (1 per cent). The Australian literacy rate is 99 per cent, the school life expectancy is 21 years, and 4.7 per cent of GDP is spent on education ranking Australia 80<sup>th</sup> in the world.

## **Government**

Australia is a federal parliamentary democracy and a Commonwealth realm. Australia gained its independence from the United Kingdom 1 January 1901.

## **Economy**

Australia's abundant and diverse natural resources attract high levels of foreign investment and include extensive reserves of coal, iron ore, copper, gold, natural gas, uranium, and renewable energy sources. A series of major investments, such as the US\$40 billion Gorgon Liquid Natural Gas project, will significantly expand the resources sector. Australia also has a large services sector and is a significant exporter of natural resources, energy, and food. Key tenets of Australia's trade policy include support for open trade and the successful culmination of the Doha Round of multilateral trade negotiations, particularly for agriculture and services. The Australian economy grew for 17 consecutive years before the global financial crisis. Subsequently, the Rudd government introduced a fiscal stimulus package worth over US\$50 billion to offset the effect of the slowing world economy, while the Reserve Bank of Australia cut interest rates to historic lows. These policies - and continued demand for commodities, especially from China - helped the Australian economy rebound after just one quarter of negative growth. The economy grew by 1.2 per cent during 2009 - the best performance in the OECD - and by 3.3 per cent in 2010. Unemployment, originally expected to reach 8-10 per cent, peaked at 5.7 per cent in late 2009 and fell to 5.1 per cent in 2010. As a result of an improved economy, the budget deficit is expected to peak below 4.2 per cent of GDP and the government could return to budget surpluses as early as 2015. Australia was one of the first advanced economies to raise interest rates, with seven rate hikes between October 2009 and November 2010. The GILLARD government is focused on raising Australia's economic productivity to ensure the sustainability of growth, and continues to manage the symbiotic, but sometimes tense, economic relationship with China. Australia is engaged in the Trans-Pacific Partnership talks and ongoing free trade agreement negotiations with China, Japan, and Korea.

Australia has a GDP of 889.6 billion (2010 est.) and ranks 18<sup>th</sup> in the world. The GDP growth rate is 3.3 per cent ranking Australia as 113<sup>th</sup> in the world. The GDP per capita is 41,300 (2010 est.), ranking Australia 17<sup>th</sup> in the world. The GDP composition by sector is agriculture (4 per cent), industry (24.8 per cent), and services (71.2 per cent).

The main agricultural products produced by Australia include wheat, barley, sugarcane, fruits, cattle, sheep and poultry. Australia's main industries are mining, industrial and transportation equipment, food processing, chemicals and steel. Australia exports coal, iron ore, gold, meat, wool, alumina,

wheat, machinery, and transport equipment. Exports are worth \$210.7 billion USD (rank 21<sup>st</sup> in the world).

Imports include machinery and transport equipment, computers and office machines, telecommunication equipment and parts, crude oil and petroleum products. Imports are worth \$200.4 billion USD (rank 21<sup>st</sup> in the world).

The telephone system, both domestic and international, in Australia can be characterized as excellent. Australia broadcasting corporation operates multiple television and radio networks and cable/satellite TV are available. Australia has 13.361 million (2010) internet hosts ranking it 8<sup>th</sup> in the world. As of 2009 there are an estimated 15.81 million internet users, ranking Australia 25<sup>th</sup> in the world.

### **3.4 Background information for Austria**

#### **Background in brief**

Once the center of power for the large Austro-Hungarian Empire, Austria was reduced to a small republic after its defeat in World War I. Following annexation by Nazi Germany in 1938 and subsequent occupation by the victorious Allies in 1945, Austria's status remained unclear for a decade. A State Treaty signed in 1955 ended the occupation, recognized Austria's independence, and forbade unification with Germany. A constitutional law that same year declared the country's "perpetual neutrality" as a condition for Soviet military withdrawal. The Soviet Union's collapse in 1991 and Austria's entry into the European Union in 1995 have altered the meaning of this neutrality. A prosperous, democratic country, Austria entered the EU Economic and Monetary Union in 1999.

#### **Geography**

Austria is located in central Europe, just north of Italy and Slovenia. Austria's land area is 83, 871 sq km, ranking it 113<sup>th</sup> in the world as far as land area. Austria lacks a coastline. Austria's climate is temperate with cold winters and moderate summers. The terrain in the west and south is mostly mountainous (the Alps). In the north and east the terrain is flat or gently sloping. The population is mostly concentrated in the eastern lowlands because of the steep slopes, poor soils and cold temperatures found elsewhere.

#### **People**

As of 2010, the population of Austria was estimated to be 8,217,280, ranking it 92<sup>nd</sup> in the world as far as population. 68 per cent of the population lives in urban areas. The major city is Vienna (the capital) with 1.693 million. Austrian's make of 91.1 per cent of Austria's population with former Yugoslavs representing 4 per cent, Turks 1.6 per cent, Germans 0.9 per cent and others/unspecified 2.4 per cent. The literacy rate is 98 per cent. The school life expectancy is 15 years and national expenditure on education is 5.4 per cent of GDP, ranking Austria 50<sup>th</sup> in the world.

#### **Government**

Austria is a federal republic. The republic was proclaimed 12 November 1918. The Austrian Empire was proclaimed 11 August 1804.

#### **Economy**

Austria, with its well-developed market economy and high standard of living, is closely tied to other EU economies, especially Germany's. Its economy features a large service sector, a sound industrial sector, and a small, but highly developed agricultural sector. Following several years of solid foreign demand for Austrian exports and record employment growth, the international financial crisis and

global economic downturn in 2008 led to a sharp but brief recession. Austrian GDP contracted 3.9 per cent in 2009 but saw positive growth of about 2 per cent in 2010. Unemployment has not risen as steeply in Austria as elsewhere in Europe, partly because its government has subsidized reduced working hour schemes to allow companies to retain employees. Stabilization measures, stimulus spending, and an income tax reform pushed the budget deficit to 3.5 per cent of GDP in 2009 and 4.7 per cent in 2010, from only about 1.3 per cent in 2008. The international financial crisis caused difficulties for Austria's largest banks whose extensive operations in central, eastern, and south-eastern Europe faced large losses. The government provided bank support - including in some instances, nationalization - to prevent insolvency and possible contagion. In the medium-term all large Austrian banks will need additional capital. Even after the global economic outlook improves, Austria will need to continue restructuring, emphasize knowledge-based sectors of the economy, and encourage greater labour flexibility and labour participation to offset growing unemployment and Austria's aging population and low fertility rate.

Austria's GDP is 332.6 billion (2010 est.) ranking it 36<sup>th</sup> in the world. The GDP growth rate is 2 per cent ranking Austria 151<sup>st</sup> in the world. GDP per capita is 40,300 (20<sup>th</sup> in the world). The composition of GDP by sectors is: agriculture 1.5 per cent, industry 29.4 per cent, and services 69.1 per cent.

The primary agricultural products produced by Austria are grains, potatoes, wine, fruit, dairy products, cattle, pigs, poultry and lumber. The main industries are construction, machinery, vehicles and parts, food, metals, chemicals, lumber and wood processing, paper and paperboard, communications equipment and tourism. Exports account for \$157.4 billion USD and include machinery and equipment, motor vehicles and parts, paper and paperboard, metal goods, chemicals, iron and steel, textiles and foodstuffs. Imports account for 156 billion and include machinery and equipment, motor vehicles, chemicals, metal goods, oil and oil products, and foodstuffs.

The telephone system, both domestic and international, in Austria can be characterized as highly developed and efficient. Commercial television and radio services were introduced in the 1990s. Cable and satellite TV are available. Austria has 3.266 million (2010) internet hosts ranking it 29<sup>th</sup> in the world. As of 2009, there are an estimated 6.143 million internet users, ranking Austria 43<sup>rd</sup> in the world.

### **3.5 Background information for the Czech Republic**

#### **Background in brief**

At the close of World War I, the Czechs and Slovaks of the former Austro-Hungarian Empire merged to form Czechoslovakia. During the interwar years, having rejected a federal system, the new country's leaders were frequently preoccupied with meeting the demands of other ethnic minorities within the republic, most notably the Sudeten Germans and the Ruthenians (Ukrainians). On the eve of World War II, the Czech part of the country was forcibly annexed to the Third Reich, and the Slovaks declared independence as a fascist ally of Nazi Germany. After the war, a reunited but truncated Czechoslovakia (less Ruthenia) fell within the Soviet sphere of influence. In 1968, an invasion by Warsaw Pact troops ended the efforts of the country's leaders to liberalize Communist Party rule and create "socialism with a human face." Anti-Soviet demonstrations the following year ushered in a period of harsh repression known as "normalization." With the collapse of Soviet-backed authority in 1989, Czechoslovakia regained its freedom through a peaceful "Velvet Revolution." On 1 January 1993, the country underwent a "velvet divorce" into its two national components, the Czech Republic and Slovakia. The Czech Republic joined NATO in 1999 and the European Union in 2004.

## **Geography**

The Czech Republic is located in central Europe between Germany, Poland, Slovakia and Austria. The Czech Republic's total land area is 78,867 sq km (115<sup>th</sup> in the world for land area) and the nation is completely landlocked. The climate is temperate with cool summers and cold winters. The terrain in the west consists of rolling plains, hills and plateaus with low mountains surrounding the area. The east is very hilly. It should be noted that some of the oldest and most significant land routes in Europe go through the Czech Republic.

## **People**

The population of the Czech Republic is 10,190,213 (2011 est.) ranking the nation 82<sup>nd</sup> in the world. 74 per cent of the population lives in urban areas. Prague is the nation's major city with 1.162 million people. The majority of the population is Czech (90.4 per cent) with Moravian (3.7 per cent), Slovak (1.9 per cent) and others (4 per cent) making up the rest of the population. The literacy rate is 99 per cent. School life expectancy is 15 years and the nation spends 4.6 per cent of GDP on education (rank 84<sup>th</sup> in the world).

## **Government**

The Czech Republic has a parliamentary democracy. Independence was gained 1 January 1993 when Czechoslovakia split into the Czech Republic and Slovakia. Czechoslovakia declared its independence from the Austro-Hungarian Empire 28 October 1918 and this is the day Czechs generally celebrate as Independence Day.

## **Economy**

The Czech Republic is a stable and prosperous market economy, which harmonized its laws and regulations with those of the EU prior to its EU accession in 2004. While the conservative, inward looking Czech financial system has remained relative healthy, the small, open, export-driven Czech economy remains very sensitive to changes in the economic performance of its main export markets, especially Germany. When Western Europe and Germany fell into recession in late 2008, demand for Czech goods plunged, leading to double digit drops in industrial production and exports. As a result, real GDP fell 4.1 per cent in 2009, with most of the decline occurring during the first quarter. Real GDP, however, has slowly recovered with positive quarter-on-quarter growth starting in the second half of 2009 and continuing throughout 2010. The auto industry remains the largest single industry and, together with its suppliers, accounts for as much as 20 per cent of Czech manufacturing. The Czech Republic produced more than a million cars for the first time in 2010, over 80 per cent of which were exported. Foreign and domestic businesses alike voice concerns about corruption, especially in public procurement. Other long term challenges include dealing with a rapidly aging population, funding an unsustainable pension and health care system, and diversifying away from manufacturing and toward a more high-tech, services-based, knowledge economy.

The Czech Republic's GDP is 262.8 billion, ranking the nation 45<sup>th</sup> in the world. The GDP growth rate is 2.3 per cent (rank 145<sup>th</sup> in the world) and GDP per capita is \$25,600 (rank 54 in the world). The GDP composition by sector is agriculture 2.2 per cent, industry 38.3 per cent, and services 59.5 per cent.

The primary agricultural products produced by the Czech Republic are wheat, potatoes, sugar beets, hops, fruit, pigs and poultry. The nation's primary industries are motor vehicles, metallurgy, machinery and equipment, glass, and armaments. Exports account for \$116.5 billion USD and consist of machinery and transport equipment, raw materials and fuel and chemicals. Imports represent 109.2 billion dollars and include machinery and transport equipment, raw materials and fuels and chemicals.

Privatization and modernization of the nation's telecommunications got a late start but is showing advancement. Mobile telephone use has increased sharply. There are 130 television broadcasters operating more than 350 channels. There are 4 publicly operated TV stations. The Czech Republic has 3.494 million (2010) internet hosts ranking it 25<sup>th</sup> in the world. As of 2009 there are an estimated 6.681 million internet users, ranking the nation 40<sup>th</sup> in the world.

## **3.6 Background information for Denmark**

### **Background in brief**

Once the seat of Viking raiders and later a major north European power, Denmark has evolved into a modern, prosperous nation that is participating in the general political and economic integration of Europe. It joined NATO in 1949 and the EEC (now the EU) in 1973. However, the country has opted out of certain elements of the European Union's Maastricht Treaty, including the European Economic and Monetary Union (EMU), European defense cooperation, and issues concerning certain justice and home affairs.

### **Geography**

Denmark is located in Northern Europe and borders both the Baltic and North seas. The nation includes several major islands. The total area of Denmark is 43,094 sq km, ranking it 133rd in the world as far geographical size. The climate is temperate with mild, windy winters and cool summers. The terrain varies from low and flat to gently rolling plains.

### **People**

The population of Denmark is 5,529,888 (2011 est.), ranking Denmark 110<sup>th</sup> in the world. Approximately 87 per cent of the population lives in urban areas. The major city is Copenhagen (the capital) with 1.174 million. The major ethnic groups are Scandinavian, Inuit, Faroese, German, Turkish, Iranian and Somali. The literacy rate is 99 per cent. School life expectancy is 17 years and the nation's expenditures on education are 7.9 per cent of GDP, ranking Denmark 12<sup>th</sup> in the world.

### **Government**

The government of Denmark is a constitutional monarchy. Denmark became a constitutional monarchy on 5 June 1849. It was unified and Christianized in ca. 965.

### **Economy**

This thoroughly modern market economy features a high-tech agricultural sector, state-of-the-art industry with world-leading firms in pharmaceuticals, maritime shipping and renewable energy, and a high dependence on foreign trade. Denmark is a member of the European Union (EU); Danish legislation and regulations conform to EU standards on almost all issues. Danes enjoy among the highest standards of living in the world and the Danish economy is characterized by extensive government welfare measures and an equitable distribution of income. Denmark is a net exporter of food and energy and enjoys a comfortable balance of payments surplus, but depends on imports of raw materials for the manufacturing sector. Within the EU, Denmark is among the strongest supporters of trade liberalization. After a long consumption-driven upswing, Denmark's economy began slowing in 2007 with the end of a housing boom. Housing prices dropped markedly in 2008-09. The global financial crisis has exacerbated this cyclical slowdown through increased borrowing costs and lower export demand, consumer confidence, and investment. The global financial crises cut Danish GDP by 0.9 per cent in 2008 and 5.2 per cent in 2009. Historically, low levels of unemployment rose sharply with the recession but remain below 5 per cent, based on the national measure, about half the level of the EU; harmonized to OECD standards the unemployment rate was about 8 per cent at the end of 2010. Denmark made a modest recovery in 2010 in part because of

increased government spending. An impending decline in the ratio of workers to retirees will be a major long-term issue. Denmark maintained a healthy budget surplus for many years up to 2008, but the budget balance swung into deficit during 2009-10. Nonetheless, Denmark's fiscal position remains among the strongest in the EU. Despite previously meeting the criteria to join the European Economic and Monetary Union (EMU), so far Denmark has decided not to join, although the Danish krone remains pegged to the euro.

The GDP of Denmark is 201.4 billion (2010 est.), ranking it 52<sup>nd</sup> the world. GDP growth is 1 per cent (2010 est.), ranking Denmark 176<sup>th</sup> in the world. The GDP per capita is 36,700 (2010 est.) (28<sup>th</sup> in the world). The GDP composition by sector is agriculture 1.1 per cent, industry 22.8 per cent, and services 76.1 per cent.

The agricultural products produced within Denmark are barley, wheat, potatoes, sugar beets, pork, dairy and fish. The industries are iron, steel, nonferrous metals, chemicals, food processing, machinery and transportation equipment, textiles and clothing, electronics, construction, furniture and other wood products, shipbuilding and refurbishment, windmills, pharmaceuticals, and medical equipment. Denmark exports \$99.37 billion worth of materials a year (world rank 35<sup>th</sup>). Exports include machinery and instruments, meat and meat products, dairy products, fish, pharmaceuticals, furniture and windmills. Denmark imports \$90.83 billion worth of materials each year. Imports include machinery and equipment, raw materials and semi-manufactures for industry, chemicals, grain and foodstuffs, and consumer goods.

The telecommunication system in Denmark is considered to be excellent. There is a strong public sector television presence and satellite/cable TV are available. Denmark has 4.145 million (2010) internet hosts ranking it 22<sup>nd</sup> in the world. As of 2009 there are an estimated 4.75 million internet users, ranking Denmark 48<sup>th</sup> in the world.

### **3.7 Background information for Estonia**

#### **Background in brief**

After centuries of Danish, Swedish, German, and Russian rule, Estonia attained independence in 1918. Forcibly incorporated into the USSR in 1940 - an action never recognized by the US - it regained its freedom in 1991 with the collapse of the Soviet Union. Since the last Russian troops left in 1994, Estonia has been free to promote economic and political ties with the West. It joined both NATO and the EU in the spring of 2004.

#### **Geography**

Estonia and is located in Eastern Europe. It borders Latvia, Russia, the Baltic Sea and the Gulf of Finland. Estonia is 45, 228 sq km in size, ranking it 132<sup>nd</sup> in the world. The climate is maritime with moderate winters and cool summers. The terrain is marshy in the lowlands, hilly in the south and flat in the north.

#### **People**

The population of Estonia is 1,282,963 (est. 2011), ranking it 154<sup>th</sup> in the world. Approximately 69 per cent of the population lives in urban areas. The major city is Tallinn (the capital) with 399,000 people. The major ethnic groups in Estonia are Estonians 68.7 per cent, Russians 25.6 per cent, Ukrainian 2.1 per cent, Belarusian 1.2 per cent, Finn 0.8 per cent and other 1.6 per cent. The literacy rate is estimated to be 99.8 per cent. School life expectancy is 16 years and the nation spends 5 per cent of GDP on education, ranking it 65<sup>th</sup> in the world.

## **Government**

Estonia is a parliamentary republic. Independence from the Soviet Union was declared 20 August 1991.

## **Economy**

Estonia, a 2004 European Union entrant, has a modern market-based economy and one of the higher per capita income levels in Central Europe and the Baltic region. Estonia's successive governments have pursued a free market, pro-business economic agenda and have wavered little in their commitment to pro-market reforms. The current government has followed relatively sound fiscal policies that have resulted in balanced budgets and very low public debt. The economy benefits from strong electronics and telecommunications sectors and strong trade ties with Finland, Sweden, and Germany. Tallinn's priority has been to sustain high growth rates - on average 8 per cent per year from 2003 to 2007. Estonia's economy slowed down markedly and fell sharply into recession in mid-2008, primarily as a result of an investment and consumption slump following the bursting of the real estate market bubble. GDP dropped nearly 14 per cent in 2009, among the world's highest rates of contraction. Rising exports to Sweden and Finland led an economic recovery in 2010, but unemployment stands above 17 per cent. Estonia joined the OECD in December 2010 and adopted the euro in January 2011.

Estonia's GDP is 24.65 billion, ranking it 113<sup>th</sup> in the world. The growth rate of GDP is 2.4 per cent (144<sup>th</sup> in the world). GDP per capita is \$19,000 (ranked 64<sup>th</sup> on the world). The GDP composition by sector is agriculture 2.5 per cent, industry 28.7 per cent, and services 68.8 per cent.

The agriculture products produced by Estonia are grain, potatoes, vegetables, livestock, dairy and fish. The main industries are engineering, electronics, wood and wood products, textiles, information technology, and telecommunications. Estonia exports \$11.5 billion worth of materials (rank 82<sup>nd</sup> in the world). Exports include machinery and electrical equipment, wood and wood products, metals, furniture, vehicles and parts, food products and beverages, textiles and plastics. Estonia imports \$12.17 billion worth of materials. Imports include machinery and electrical equipment, mineral fuels, chemical products, foodstuffs, plastics, and textiles.

Telecommunications is generally excellent. Internet is widely available. A large percentage of the population does their taxes online and online voting was used in the 2005 elections. There are 2 publically owned TV stations and cable TV service has wide penetration with half of Estonian households connected. Estonia has 729, 543 (2010) internet hosts ranking it 48<sup>th</sup> in the world. As of 2009 there are an estimated 4 971,700 internet users, ranking Estonia 102<sup>nd</sup> in the world.

## **3.8 Background Information for Finland**

### **Background in brief**

Finland was a province and then a grand duchy under Sweden from the 12th to the 19th centuries, and an autonomous grand duchy of Russia after 1809. It won its complete independence in 1917. During World War II, it was able to successfully defend its freedom and resist invasions by the Soviet Union - albeit with some loss of territory. In the subsequent half century, the Finns made a remarkable transformation from a farm/forest economy to a diversified modern industrial economy; per capita income is now among the highest in Western Europe. A member of the European Union since 1995, Finland was the only Nordic state to join the euro system at its initiation in January 1999. In the 21st century, the key features of Finland's modern welfare state are a high standard of education, equality promotion, and national social security system - currently challenged by an aging population and the fluctuations of an export-driven economy.

## **Geography**

Finland is located in North Europe. It borders Sweden and Russia as well as the Baltic Sea, Gulf of Bothnia and the Gulf of Finland. The total land area of Finland is 338,145 sq km, ranking Finland 64<sup>th</sup> in the world. The climate is cold temperate and potential subarctic in some areas. The temperature is moderated by the North Atlantic current, Baltic Sea and many lakes. Finland's terrain is mostly low, flat to rolling plains.

## **People**

The population of Finland is 5,259,250, ranking Finland 113<sup>th</sup> in the world. Approximately 85 per cent of the population lives in urban areas. The major city (the capital) is Helsinki with 1.107 million. Finland's primary ethnic groups are Finns 93.4 per cent, Swedes 5.6 per cent, Russians 0.5 per cent, Estonians 0.3 per cent, Roma 0.1 per cent and Sami 0.1 per cent. The literacy rate is 100 per cent. School life expectancy is 17 years and national expenditure on education is 5.4 per cent of GDP.

## **Government**

Finland is a republic. Independence from Russia was obtained 6 December 1917.

## **Economy**

Finland has a highly industrialized, largely free-market economy with per capita output roughly that of Austria, Belgium, the Netherlands, and Sweden. Trade is important with exports accounting for over one third of GDP in recent years. Finland is strongly competitive in manufacturing - principally the wood, metals, engineering, telecommunications, and electronics industries. Finland excels in high-tech exports such as mobile phones. Except for timber and several minerals, Finland depends on imports of raw materials, energy, and some components for manufactured goods. Because of the climate, agricultural development is limited to maintaining self-sufficiency in basic products. Forestry, an important export earner, provides a secondary occupation for the rural population. Finland had been one of the best performing economies within the EU in recent years and its banks and financial markets avoided the worst of global financial crisis. However, the world slowdown hit exports and domestic demand hard in 2009, with Finland experiencing one of the deepest contractions in the euro zone. A recovery of exports, domestic trade, and household consumption stimulated economic growth in 2010. The recession left a deep mark on general government finances and the debt ratio, turning previously strong budget surpluses into deficits. Despite good growth prospects, general government finances will remain in deficit during the next few years. The great challenge of economic policy will be to implement a post-recession exit strategy in which measures supporting growth will be combined with general government adjustment measures. Longer-term, Finland must address a rapidly aging population and decreasing productivity that threaten competitiveness, fiscal sustainability, and economic growth.

The GDP of Finland is 187.6 billion (ranked 56<sup>th</sup> in the world). The GDP growth rate is 3.2 per cent (118<sup>th</sup> in the world). GDP per capita is \$35,300 (ranked 35<sup>th</sup> in the world). GDP composition by sector is agriculture 2.6 per cent, industry 29.1 per cent, and services 68.2 per cent.

The major agricultural products produced by Finland are barley, wheat, sugar beets, potatoes, dairy and fish. The major industries are metals and metal products, electronics, machinery and scientific instruments, shipbuilding, pulp and paper, foodstuffs, chemicals, textiles and clothing. Finland exports \$73.53 billion in materials (40<sup>th</sup> in the world). Exports include electrical and optical equipment, machinery, transport equipment, paper and pulp, chemicals, basic metals and timber. Finland imports \$69.11 billion in materials (39<sup>th</sup> in the world). Imports include foodstuffs, petroleum and petroleum products, chemicals, transport equipment, iron and steel, machinery, textile yarn and fabrics, and grains.

Telecommunications is generally excellent. Internet is widely available. There is a mix of publically and privately owned TV stations. Cable and satellite TV are available. Finland has 4.394 million (2010) internet hosts. As of 2009 there are an estimated 4.393 million internet users.

### **3.9 Background information for Korea**

#### **Background in brief**

An independent Korean state or collection of states has existed almost continuously for several millennia. Between its initial unification in the 7th century - from three predecessor Korean states - until the 20th century, Korea existed as a single independent country. In 1905, following the Russo-Japanese War, Korea became a protectorate of imperial Japan, and in 1910 it was annexed as a colony. Korea regained its independence following Japan's surrender to the United States in 1945. After World War II, a Republic of Korea (ROK) was set up in the southern half of the Korean Peninsula while a Communist-style government was installed in the north (the DPRK). During the Korean War (1950-53), US troops and UN forces fought alongside soldiers from the ROK to defend South Korea from DPRK attacks supported by China and the Soviet Union. An armistice was signed in 1953, splitting the peninsula along a demilitarized zone at about the 38th parallel. Thereafter, South Korea achieved rapid economic growth with per capita income rising to roughly 17 times the level of North Korea. In 1993, KIM Young-sam became South Korea's first civilian president following 32 years of military rule. South Korea today is a fully functioning modern democracy. President LEE Myung-bak has pursued a policy of global engagement since taking office in February 2008, highlighted by Seoul's hosting of the G-20 summit in November 2010. Serious tensions with North Korea have punctuated inter-Korean relations in recent years, including the North's sinking of the South Korean warship Cheonan in March 2010 and its artillery attack on South Korean soldiers and citizens in November 2010.

#### **Geography**

South Korea is located in Eastern Asia and occupies the southern half of the Korean Peninsula. South Korea borders the Sea of Japan and the Yellow Sea. The total land area of South Korea is 99,720 sq km (ranked 108<sup>th</sup> in the world). The climate is temperate with heavy rainfall during summer. The terrain is mostly mountains and hills although there are wide coastal plains in the west and south.

#### **People**

The population of South Korea is 48,754,657 (ranked 26<sup>th</sup> in the world). Approximately 83 per cent of the population lives in urban areas. Major cities include Seoul (the capital) with 9.778 million, Busan with 3.439 million, Incheon with 2.572 million, Daegu with 2.458 million and Daejeon with 1.497 million. South Korea is homogenous with respect to ethnicity although approximately 20,000 Chinese live in S. Korea. The literacy rate is 97.9 per cent. School life expectancy is 17 years and the nation spends 4.2 per cent of GDP on education.

#### **Government**

South Korea is a republic. It gained independence from Japan 15 August 1945.

#### **Economy**

Since the 1960s, South Korea has achieved an incredible record of growth and global integration to become a high-tech industrialized economy. Four decades ago, GDP per capita was comparable with levels in the poorer countries of Africa and Asia. In 2004, South Korea joined the trillion dollar club of world economies, and currently is among the world's 20 largest economies. Initially, a system of close government and business ties, including directed credit and import restrictions, made this success possible. The government promoted the import of raw materials and technology at the expense of

consumer goods, and encouraged savings and investment over consumption. The Asian financial crisis of 1997-98 exposed longstanding weaknesses in South Korea's development model including high debt/equity ratios and massive short-term foreign borrowing. GDP plunged by 6.9 per cent in 1998, and then recovered by 9 per cent in 1999-2000. Korea adopted numerous economic reforms following the crisis, including greater openness to foreign investment and imports. Growth moderated to about 4-5 per cent annually between 2003 and 2007. With the global economic downturn in late 2008, South Korean GDP growth slowed to 0.2 per cent in 2009. In the third quarter of 2009, the economy began to recover, in large part due to export growth, low interest rates, and an expansionary fiscal policy, and growth exceeded 6 per cent in 2010. The South Korean economy's long term challenges include a rapidly aging population, inflexible labor market, and overdependence on manufacturing exports to drive economic growth.

South Korea's GDP is \$1.467 trillion (13<sup>th</sup> in the world). The GDP growth rate is 6.1 per cent (ranked 38<sup>th</sup> in the world). GDP per capita is \$30, 200 (44<sup>th</sup> on the world). The GDP composition by sector is agriculture 3 per cent, industry 39.4 per cent and services 57.6 per cent.

South Korea's primary agricultural products are rice, root crops, barley, vegetables, fruit, cattle, pigs, chickens, dairy, eggs and fish. Primary industries are electronics, telecommunications, automobile production, chemicals, shipbuilding and steel. S. Korea exports \$466.3 billion (ranked 7<sup>th</sup> in the world) in materials. Exports include semiconductors, wireless telecommunications equipment, motor vehicles, computers, steel, ships, and petrochemicals. Korea imports \$417.9 billion (10<sup>th</sup> in the world). Imports include machinery, electronics and electronics equipment, oil, steel, transport equipment, organic chemicals and plastics.

South Korea has an excellent domestic and international telecommunication system. There are multiple national television networks with 2 of 3 publically operated. Cable and satellite TV are available. There are 291,329 internet hosts (2010 est.) and 39.4 million internet users.

### **3.10 Background information for Slovenia**

#### **Background in brief**

The Slovene lands were part of the Austro-Hungarian Empire until the latter's dissolution at the end of World War I. In 1918, the Slovenes joined the Serbs and Croats in forming a new multinational state, which was named Yugoslavia in 1929. After World War II, Slovenia became a republic of the renewed Yugoslavia, which though Communist, distanced itself from Moscow's rule. Dissatisfied with the exercise of power by the majority Serbs, the Slovenes succeeded in establishing their independence in 1991 after a short 10-day war. Historical ties to Western Europe, a strong economy, and a stable democracy have assisted in Slovenia's transformation to a modern state. Slovenia acceded to both NATO and the EU in the spring of 2004; it joined the eurozone in 2007.

#### **Geography**

Slovenia is located in south Central Europe between Austria and Croatia. Slovenia's total land area is 20,273 sq km (ranked 154<sup>th</sup> in the world). Slovenia has a Mediterranean climate on the coast and a continental climate elsewhere. Summers are mild to hot and winters are cold in the eastern plateaus and valleys. Regarding terrain, Slovenia has a coastal strip along the Adriatic. Otherwise it is comprised of mixed mountains and valleys. Some of Europe's major transit routes run through Slovenia.

#### **People**

The population of Slovenia is estimated to be 2,000,092 (ranked 145<sup>th</sup> in the world). Approximately 50 per cent of the population lives in urban areas. Ljubljana (capital) is the major city with 260,000

people. The major ethnic group within Slovenia is Slovene 83.1 per cent followed by Serb 2 per cent, Croat 1.8 per cent, Bosniak 1.1 per cent and other/unspecified 12 per cent. The literacy rate is 99.7 per cent. School life expectancy is 17 years and the nation spends 5.2 per cent of GDP on education.

### **Government**

Slovenia is a parliamentary republic. Independence from Yugoslavia was obtained 25 June 1991.

### **Economy**

Slovenia became the first 2004 European Union entrant to adopt the euro (on 1 January 2007) and has become a model of economic success and stability for the region. With the highest per capita GDP in Central Europe, Slovenia has excellent infrastructure, a well-educated work force, and a strategic location between the Balkans and Western Europe. Privatization has lagged since 2002, and the economy has one of highest levels of state control in the EU. Structural reforms to improve the business environment have allowed for somewhat greater foreign participation in Slovenia's economy and have helped to lower unemployment. In March 2004, Slovenia became the first transition country to graduate from borrower status to donor partner at the World Bank. In December 2007, Slovenia was invited to begin the accession process for joining the OECD. Despite its economic success, foreign direct investment (FDI) in Slovenia has lagged behind the region average, and taxes remain relatively high. Furthermore, the labor market is often seen as inflexible, and legacy industries are losing sales to more competitive firms in China, India, and elsewhere. In 2009, the world recession caused the economy to contract - through falling exports and industrial production - by more than 8 per cent, and unemployment to rise above 9 per cent. Although growth resumed in 2010, the unemployment rate continued to rise, topping 10 per cent.

Slovenia's GDP is \$56.81 billion (88<sup>th</sup> in the world). The GDP growth rate is 1 per cent (2010 est.) (178<sup>th</sup> in the world). GDP per capita is \$28,400 (50<sup>th</sup> in the world). GDP composition by sector is agriculture 2.4 per cent, industry 31 per cent, and services 66.6 per cent.

The main agriculture products produced by Slovenia are potatoes, hops, wheat, sugar beets, corn, grapes, cattle, sheep and poultry. The main industries are ferrous metallurgy and aluminium products, lead and zinc smelting, electronics, trucks, automobiles, electric power equipment, wood products, textiles, chemicals and machine tools. Slovenia exports \$24.97 billion worth of materials (rank 65<sup>th</sup> in the world). Exports include manufactured goods, machinery and transport equipment, chemicals and food. Slovenia imports \$25.96 billion worth of materials (rank 62<sup>nd</sup> in the world). Imports include machinery and transport equipment, manufactured goods, chemicals, fuels and lubricants, and food.

The telecommunications network in Slovenia is well developed. There is a mix of public and private TV stations and 60 per cent of households are connected to multi-channel cable TV Slovenia has 137,494 internet hosts and 1.298 million internet users.

## **3.11 Background Information for Sweden**

### **Background in brief**

A military power during the 17th century, Sweden has not participated in any war for almost two centuries. An armed neutrality was preserved in both world wars. Sweden's long-successful economic formula of a capitalist system interlarded with substantial welfare elements was challenged in the 1990s by high unemployment and in 2000-02 and 2009 by the global economic downturns, but fiscal discipline over the past several years has allowed the country to weather economic vagaries. Sweden joined the EU in 1995, but the public rejected the introduction of the euro in a 2003 referendum.

## **Geography**

Sweden is located in Northern Europe between Finland and Norway. It borders the Baltic Sea and Gulf of Bothnia. Sweden's total land area is 450,295 sq km (rank 55<sup>th</sup> in the world). The climate is temperate in the south and subarctic in the north. In the south winters are cold and summers are cool. The terrain is mostly flat with gently rolling lowlands but there are some mountains in the west. Sweden is strategically located along the Danish Straits linking the Baltic and North Seas.

## **People**

The population of Sweden is 9,088,728 (2011 est.) (rank 90<sup>th</sup> in the world). Approximately 85 per cent of the population lives in urban areas. The major city is Stockholm (capital) with 1.279 million. The major ethnic groups are Swedes, Finns and Sami who are indigenous and Finns, Yugoslavs, Danes, Norwegians, Greeks and Turks who are immigrants. The literacy rate is 99 per cent. School life expectancy is 16 years and the government spends 6.7 per cent of GDP on education.

## **Government**

Sweden is a constitutional monarchy. Sweden achieved independence 6 June 1523.

## **Economy**

Aided by peace and neutrality for the whole of the 20th century, Sweden has achieved an enviable standard of living under a mixed system of high-tech capitalism and extensive welfare benefits. It has a modern distribution system, excellent internal and external communications, and a skilled labor force. In September 2003, Swedish voters turned down entry into the euro system concerned about the impact on the economy and sovereignty. Timber, hydropower, and iron ore constitute the resource base of an economy heavily oriented toward foreign trade. Privately owned firms account for about 90 per cent of industrial output, of which the engineering sector accounts for 50 per cent of output and exports. Agriculture accounts for little more than 1 per cent of GDP and of employment. Until 2008, Sweden was in the midst of a sustained economic upswing, boosted by increased domestic demand and strong exports. This and robust finances offered the center-right government considerable scope to implement its reform program aimed at increasing employment, reducing welfare dependence, and streamlining the state's role in the economy. Despite strong finances and underlying fundamentals, the Swedish economy slid into recession in the third quarter of 2008 and growth continued downward in 2009 as deteriorating global conditions reduced export demand and consumption. Strong exports of commodities and a return to profitability by Sweden's banking sector drove the strong rebound in 2010.

Sweden's GDP is \$354 billion (33<sup>rd</sup> in the world). The GDP growth rate is 4.1 per cent (81<sup>st</sup> in the world). GDP per capita is \$39,000 (23<sup>rd</sup> in the world). GDP composition by sector is agriculture 1.7 per cent, industry 26.1 per cent, and services 72.2 per cent.

The agricultural products Sweden produces are barley, wheat, sugar beets, meat and milk. The primary industries are iron and steel, precision equipment, wood pulp and paper products, processed foods and motor vehicles. Sweden's exports \$162.6 billion in materials (27<sup>th</sup> in the world). Exports include machinery, motor vehicles, paper products, pulp and wood, iron and steel products, and chemicals. Sweden imports \$158.6 billion in materials (27<sup>th</sup> in the world). Imports include machinery, petroleum and petroleum products, chemicals, motor vehicles, iron and steel, foodstuffs, and clothing.

Telecommunications in Sweden are excellent. Sweden is ranked among leading countries for fixed-line, mobile-cellular, internet and broadband penetration. There are both public and private TV stations and cable/satellite TV is available. There are 4.396 million internet hosts in Sweden and 8.298 million internet users.

# Chapter 4

## Innovation Models: Qualitative Data

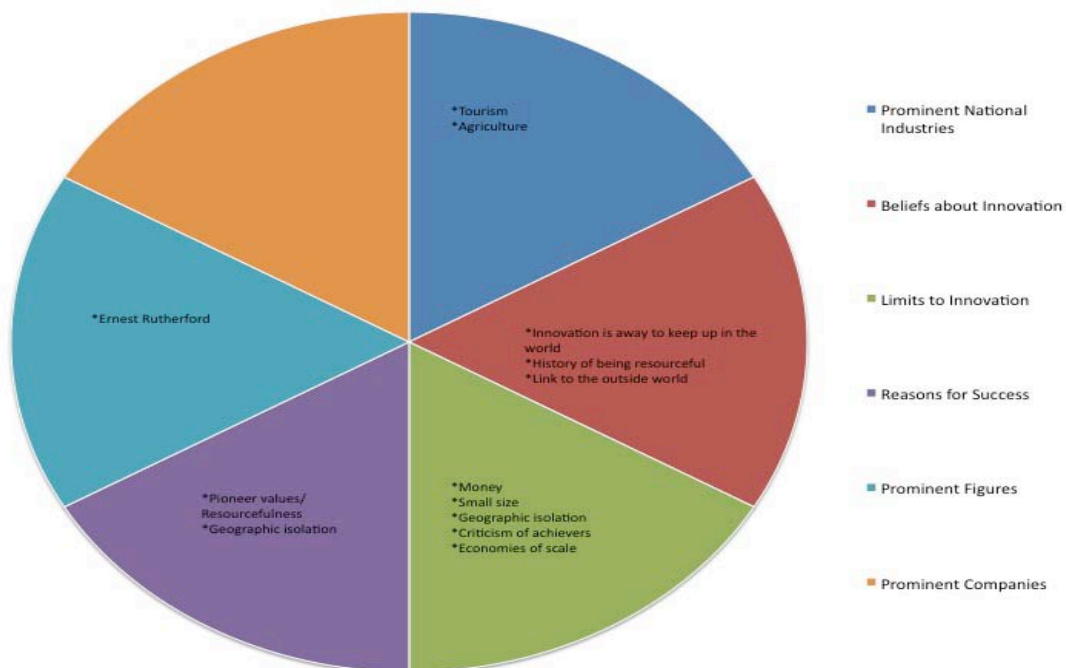
### 4.1 Introduction

The models presented in this chapter are largely self-explanatory. Each figure shows six categories of national innovation, and within each category the relevant elements derived from the interview data are listed. Each figure is colour coded to enable the category to be identified easily. Beyond the data presented in the figures, the responses to the interview questions also provided the material for expanding on the thinking and ideas presented in each category.

In order to avoid being repetitive, the discussion following each model will focus on the most important aspects of each model and any overarching conclusions about a nation's national innovation identity. By comparing New Zealand Innovation identity with those of other nations, lessons can be learned. The comparisons will highlight points of similarity and divergence between New Zealand and the nations covered in this report and any potential messages regarding New Zealand's innovation landscape that might be garnered via comparison.

### 4.2 New Zealand innovation model

Figure 4.1: New Zealand innovation identity



New Zealand's model of innovation identity highlights the belief that New Zealanders are resourceful. This resourcefulness comes, in part, from the isolation of New Zealand. New Zealanders had to modify available resources to suit their own needs as getting new materials was not always easy. New Zealand's distance from other nations was seen as both a positive for innovation and a negative. In the past, being inventive was necessary for survival thereby breeding a culture of people willing to think outside the box but in the present day New Zealand's geographic isolation is seen as

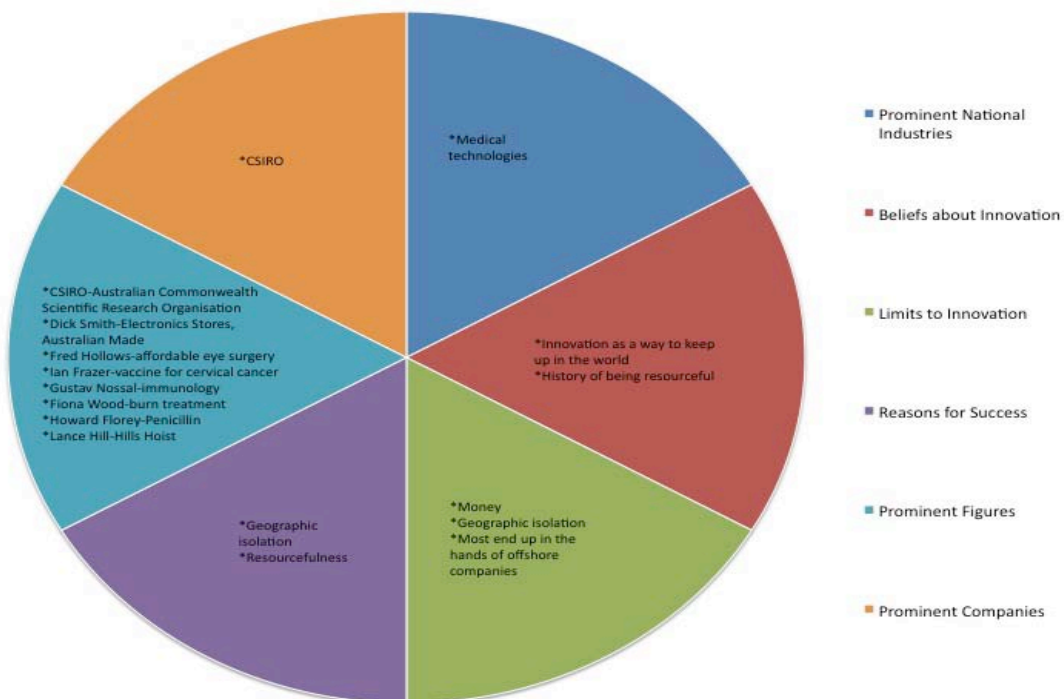
a detriment to innovation. The small size of the country coupled with its distance from other trading nations is viewed as a hindrance to innovation success. The national market is too small and the international market is too far. Economies of scale do not work in New Zealand’s favour, with the consumer base of the nation being too small to allow for the price of production to be minimized by increasing the scale of production.

Respondents saw innovation as a way for the country to keep up in the world and also as something that links them to the outside world. With the advent of the internet and improved telecommunications, some of the isolation felt by New Zealanders was assuaged.

Unlike many of the countries to be discussed in this chapter, respondents could name few prominent figures who were either inventors or known for being innovative in some way. Ernest Rutherford, the man who split the atom, was the only person frequently named. The absence of high profile figures in science, technology and innovation is an interesting point to note given that respondents thought that New Zealanders were an inventive group of people. It suggests that many inventors may not make it to the commercialisation phase where their names would become known and that prominent scientists and technologists may not be getting the national recognition that they deserve. It is also important to note that the category for prominent companies is blank in the New Zealand model meaning that no companies showed up as significant for New Zealand’s innovation identity. This is a sharp contrast to many of the other countries studied where, in some cases, several companies contribute to innovation identity. The absence of any companies in this category indicates the innovation landscape as measured by innovative companies is either small and/or not particularly visible in New Zealand. If companies are not visible by the national community, it is also likely that they are not recognised by the international community.

### 4.3 Australia innovation model

Figure 4.2: Australian innovation identity



Australia’s innovation identity is similar to New Zealand’s in many ways. Like New Zealand, innovation is seen as a way for Australia to keep up with the world and respondents believed

Australians were historically quite resourceful. Further, geographic isolation was seen as both a plus and minus with respect to innovation. It helped drive Australians to be inventive but also served to limit the nation’s current innovative potential.

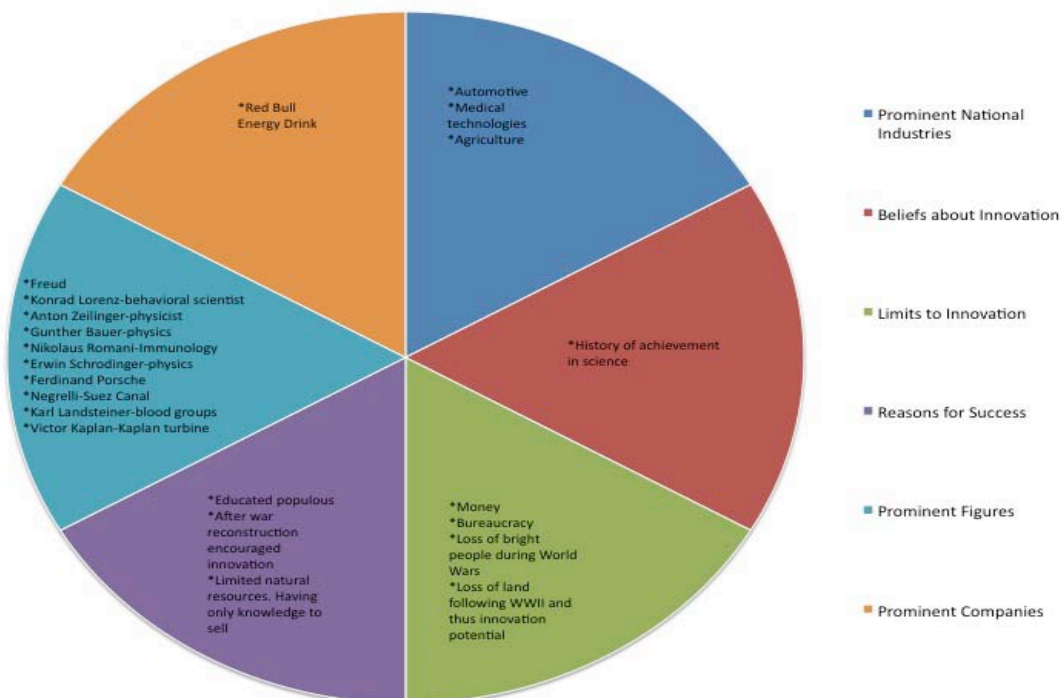
Unlike New Zealand, respondents could name a number of innovative Australians with those names ranging from entrepreneurs to a host of medical scientists indicating a great public awareness of those prominent in science and technology within Australia. It should be noted that only one organization, CSIRO (The Commonwealth Science and Industrial Research Organization), was named as a prominent Australian company known for innovation. CSIRO is a government-funded organization promoting national innovation. The absence of any private companies in this category indicates the innovation landscape as measured by innovative companies is either small and/or not particularly visible in Australia.

### Takeaway points for New Zealand

- With a similar innovation identity to New Zealand, New Zealand policy makers should pay attention to how Australia manages its innovation policy. Currently, Australia could arguably be considered to have a slightly healthier innovation identity than New Zealand.
- Respondents saw CSIRO, a government sponsored organization similar to New Zealand’s Crown Research Institutes, as being representative of Australian Innovation. CSIRO is a centralized organization focused on science and industrial research. Perhaps, it is this centralization that is giving the organization the visibility it has among Australians. If this is the case, New Zealand’s innovation landscape might be better served by consolidating its many diverse crown research institutes into fewer, larger organizations with higher visibility and thus prominence within the public sphere.

## 4.4 Austria innovation model

Figure 4.3: Austrian innovation identity



Austrian respondents saw their nation as having a long history of achievement in science and accordingly named historical figures when asked about prominent Austrian's known for being innovative. Some of these figures such as Freud, Lorenz and Porsche are internationally known for their achievements. Respondents also believed that the nation had to be innovative because natural resources were limited within Austria.

Austria's involvement in World War II was seen as limiting innovation. Bright people were lost in the war (either killed or moved elsewhere to avoid the Nazis). Further, Austria lost territory after the war along with a subset of Austrians with innovative potential that lived in those territories. Although WWII was seen as detrimental in many regards, the reconstruction that followed was viewed as something that helped spur innovation in Austria.

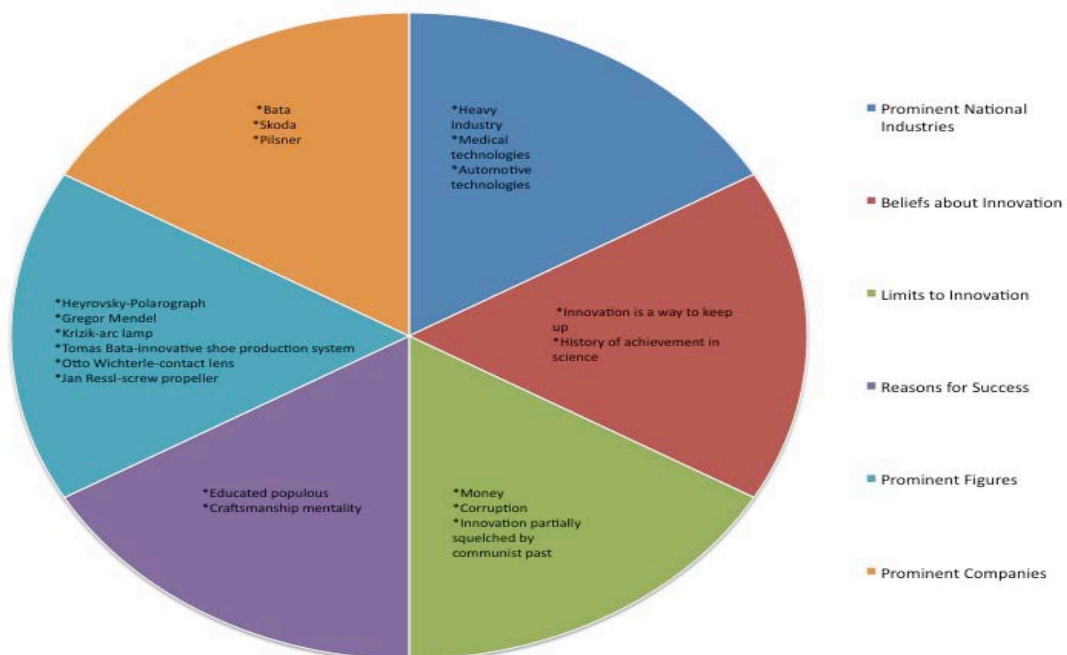
It should be noted that only one company, Red Bull, was routinely named by Austrians as being innovative. This suggests that the innovation landscape as measured by innovative companies is either small and/or not particularly visible in Austria.

### Takeaway points for New Zealand

- Austria is one of several nations to mention a lack of natural resources as helping to spur innovation within the country. New Zealand is comparatively plentiful in resources such as arable farmland, grazing land, water and forests. It may be the case that New Zealand has historically rested on its laurels regarding innovation because agriculture and forestry supplied the country with sufficient capital.
- Austrian respondents believed the calibre of education received aided in the nation's innovation success. Education was not mentioned by New Zealand respondents as a reason for success and this might be an area where improvements could be made in New Zealand. Academic achievement is not culturally emphasized in New Zealand (Smithies, 2008).

## 4.5 Czech innovation model

Figure 4.4: Czech innovation identity



Like New Zealand, innovation was seen as a way for the Czech Republic to keep up in the world. Respondents also noted that the Czech republic had a history of scientific achievement, and when asked about innovative Czechs they named many important historical figures, some of whom would be internationally known like Gregor Mendel.

As will be seen in the discussion of the Estonian and Slovenian models, respondents believed that the Czech Republic’s communist past was responsible for squelching innovation. Corruption was also seen as a factor inhibiting innovation within the Czech Republic.

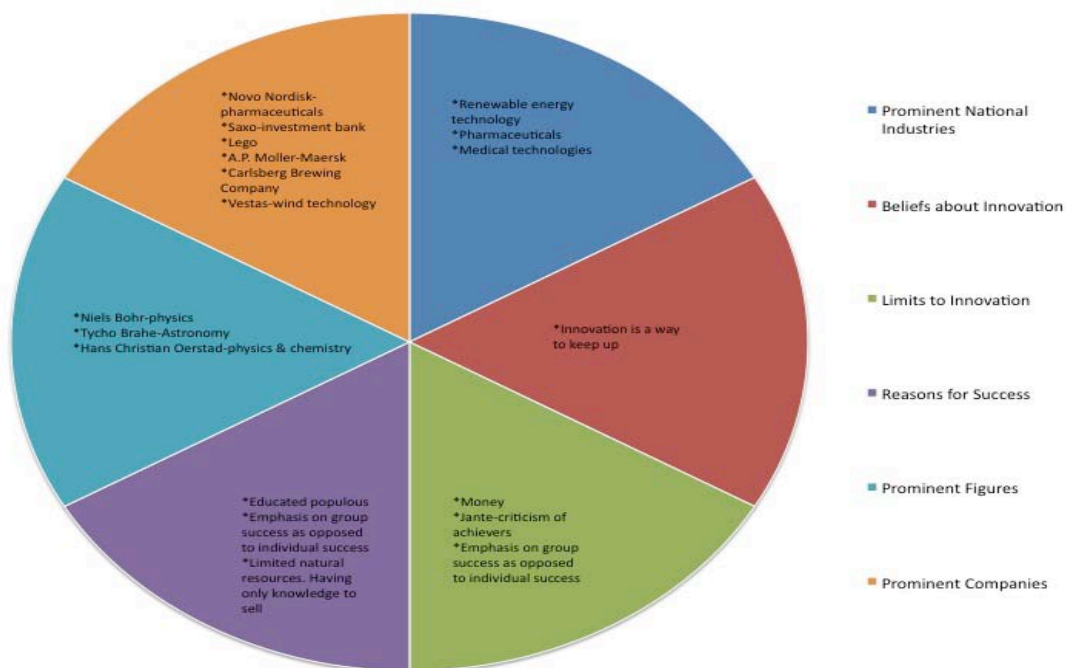
Respondents routinely named three Czech companies as being particularly innovative, Skoda (a car company), Pilsner (beer) and Bata (shoes). Compared to New Zealand, Australia and Austria, the visibility of these three companies in the Czech Republic may indicate a healthier innovation landscape as measured by innovative companies. It is important to note that all three of these companies are also international known companies.

### Takeaway points for New Zealand

- Czech respondents believed the calibre of education Czechs received aided in the nation’s innovation success. Education was not mentioned by New Zealand respondents as a reason for success and this might be an area where improvements could be made in New Zealand. Academic achievement is not culturally emphasized in New Zealand (Smithies, 2008).

## 4.6 Denmark innovation model

Figure 4.5: Danish innovation identity



Like New Zealand, Australia, and the Czech Republic, Danish respondents saw innovation as a way for Denmark to keep up with the world.

Similar to New Zealand, Danish respondents mentioned criticism of achievers as being a limit to innovation. They also mentioned that a cultural emphasis on group success as opposed to individual success may limit innovation but also consider this as a feature that supports innovation.

Like Austrian respondents, Danish respondents saw the nation’s limited natural resources as playing a role in spurring national innovation. Respondents believed that Denmark had only its knowledge to sell. Respondents routinely mentioned three figures as being prominent Danish innovators and all three are arguably well-known internationally as significant figures in their respective fields.

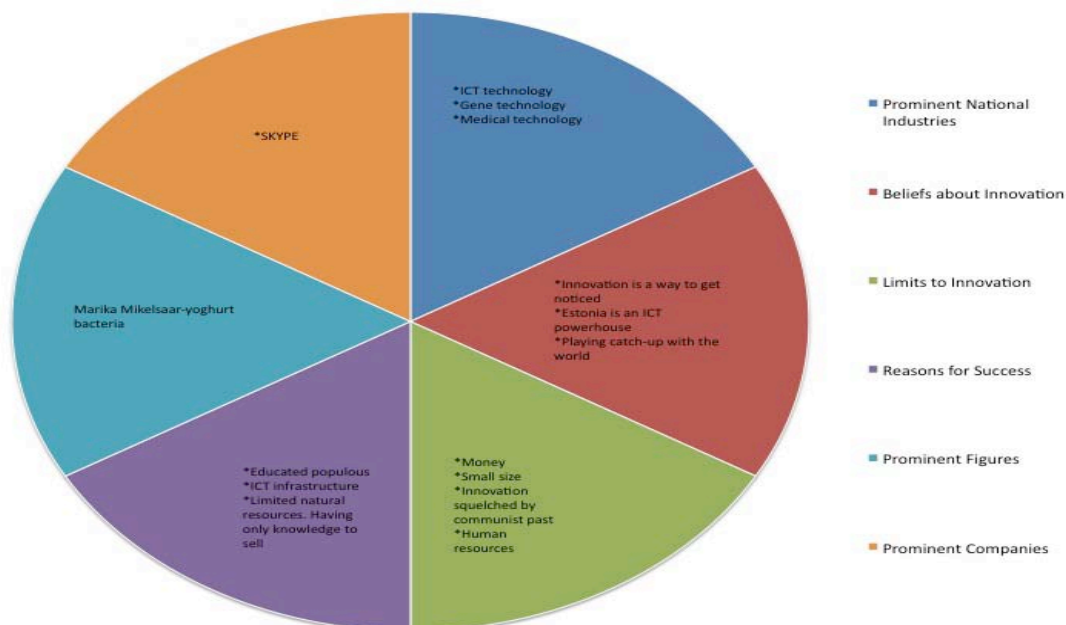
Danish respondents mentioned a number of Danish companies they saw as innovative. These companies ranged from a pharmaceutical firm (Novo Nordisk) to one that brews and sells beer (Carlsberg). The fact that respondents routinely mentioned several of these companies during their interview suggests that the companies have relatively high visibility within the national community and that the innovation landscape as measured by the prominence of innovative companies is healthy. It is important to note that a number of the companies mentioned by respondents are internationally known companies.

### Takeaway points for New Zealand

- Denmark has a reputation as an environmental nation and has capitalized on this reputation by developing renewable energy technology. A country which markets itself to tourists as clean, green and 100 per cent pure is well placed to be known for environmental-type technologies. This could be an area where New Zealand really stands out in the international community and one that already fits with the international image the nation has.
- Danish respondents believed the calibre of education they received aided in the nation’s innovation success. Education was not mentioned by New Zealand respondents as a reason for success and this might be an area where improvements could be made in New Zealand. Academic achievement is not culturally emphasized in New Zealand (Smithies, 2008).

## 4.7 Estonia innovation model

Figure 4.6: Estonian innovation identity



For Estonian respondents innovation was seen as a way for Estonia to get noticed in the world. They saw Estonia as an emerging ICT powerhouse. The limits to Estonia’s future success in innovation were the nation’s small size, its communist past which squelched innovation, and a lack of human resources. Estonia’s population is quite small with a little over 1.2 million people. The ICT

infrastructure already in place was seen as something that would help Estonian innovation as was the fact that Estonia has limited natural resources and therefore must sell knowledge.

Like New Zealand, only one individual was routinely named as being a prominent figure in science, technology or innovation. Further, only one company, Skype, was named as an important innovative Estonian company. With respect to Skype it is important to note that at the time of the interviews Skype was owned by Swedes. Estonia claims ownership of Skype, in part because one of the original developers of the technology was Estonian.

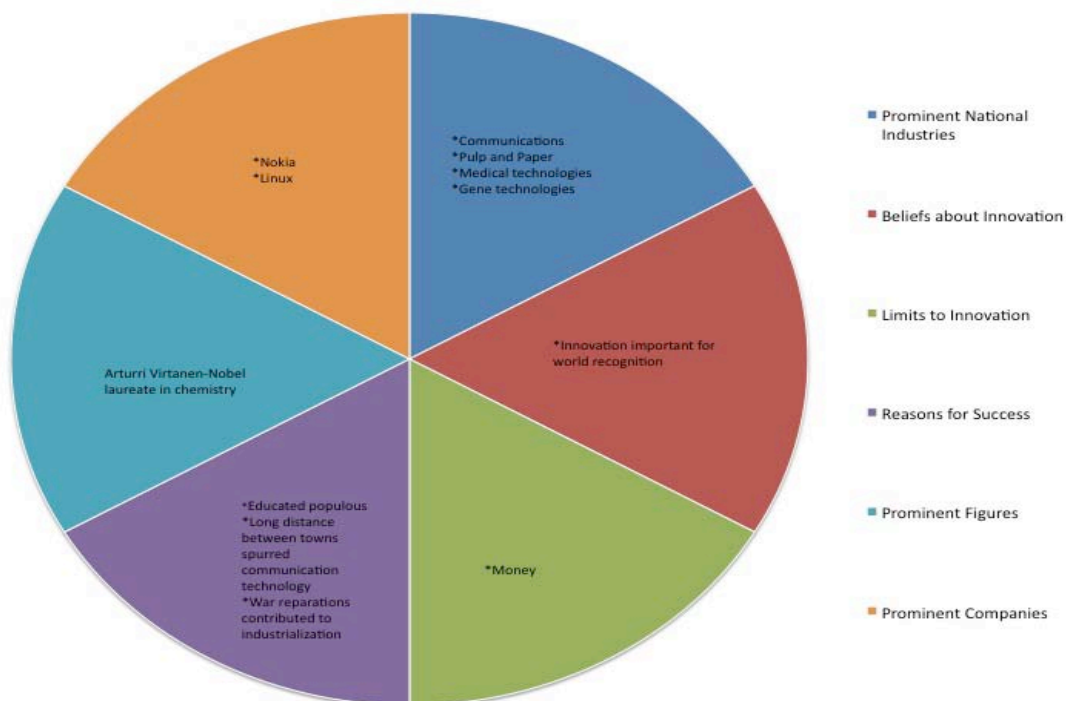
The data on Estonia is paradoxical. Estonian’s saw their nation as an ICT powerhouse. Despite this, respondents routinely named only one ICT type company as being an exemplar of Estonian innovation, a company that was not, in fact, owned by Estonians or operated in Estonia. The results suggest that Estonian ICT companies do not have a public persona to the degree that perhaps they should given the belief that the country is a powerhouse in this arena.

**Takeaway points for New Zealand**

- New Zealand respondents saw innovation as a way to keep up with the world. Estonian respondents saw innovation as a way to get noticed in the world. The latter view is the healthier one to have if a nation hopes to become known for innovation. Work needs to be done to change New Zealander’s views on the nation’s innovation potential.
- Estonian respondents believed the calibre of education Estonian’s received aided in the nation’s innovation success. Education was not mentioned by New Zealand respondents as a reason for success and this might be an area where improvements could be made in New Zealand. Academic achievement is not culturally emphasized in New Zealand (Smithies, 2008).

**4.8 Finland innovation model**

**Figure 4.7: Finnish innovation identity**



Finnish respondents saw innovation as a way for Finland to receive world recognition. The only limit to Finnish innovation was money. It was believed that innovation in Finland was spurred in part by the war reparations Finland was required to pay following World War II. Further, the long distance between towns was thought to have stimulated innovation, particularly in the communications sector where Finland is known to be an internationally dominant figure.

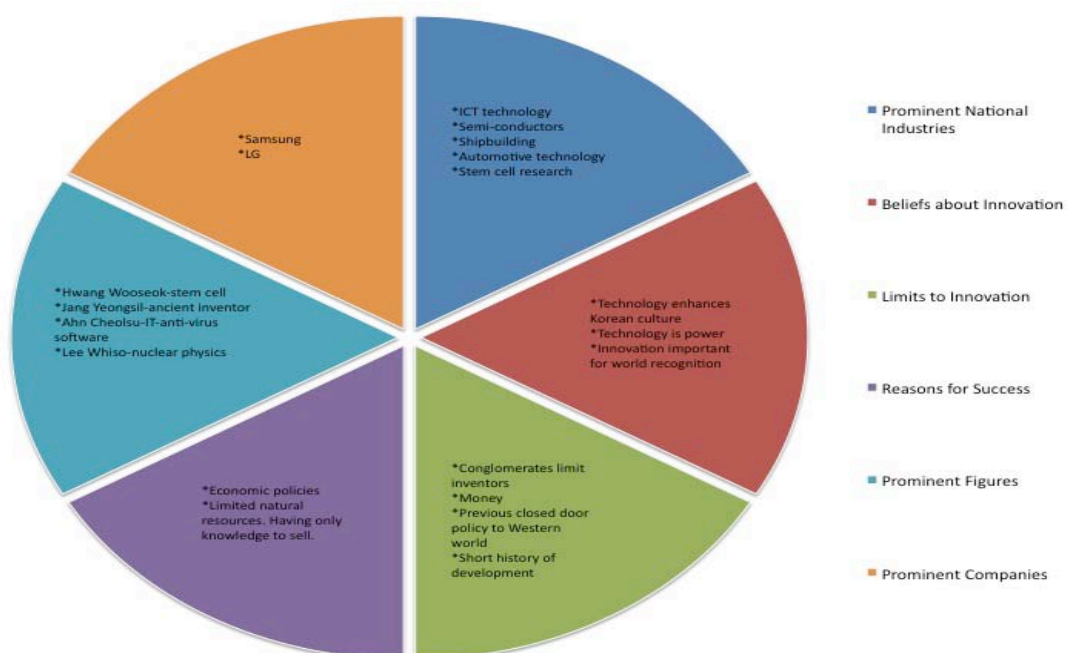
Like New Zealand, Finnish respondents could routinely name only one figure, Arturi Virtanen, a chemistry laureate as exemplifying Finnish innovativeness. Two companies, Nokia and Linux, were routinely named as being innovative. Although only two companies were named the companies, particularly Nokia, contribute significantly to Finnish GDP. Nokia has a large share of the international communications market. Research on Finnish cultural and national identity showed that Nokia is considered to be a national symbol of Finland (Rinne and Fairweather, 2011).

### Takeaway points for New Zealand

- Innovation and education policies within Finland are known to be quite pioneering (Fairweather et al. 2010) and should be evaluated by New Zealand policy makers as the two nations share many features in common yet Finland has had significantly more success in the innovation realm than New Zealand. Lacking a history of science, technological or innovation achievement need not be a detriment to current achievement as demonstrated by Finland. Similarly, being small is not an excuse for not achieving innovation success.
- A large, highly visible multinational like Nokia can serve as a cornerstone for a nation as they build their innovation landscape. Such a cornerstone can make the nation internationally recognizable as being innovative and can give the national community a symbol of their success in this arena.
- Finnish respondents believed the calibre of education they received aided in the nation’s innovation success. Education is not mentioned by New Zealand respondents as a reason for success and this might be an area where improvements could be made in New Zealand. Academic achievement is not culturally emphasized in New Zealand (Smithies, 2008).

## 4.9 South Korea innovation model

Figure 4.8: South Korean innovation identity



Compared to the other countries analyzed in this report, South Korea's innovation identity has many unique features. South Korean respondents saw innovation as a way for the nation to garner world recognition and this is similar to the view in Finland and Sweden. However, they also saw technology as being a form of power and as something that enhances South Korean culture. Of the countries analyzed this view is unique to South Korea.

South Korea's previous closed door policy to the West, its short history of development and the presence of South Korean conglomerates (Chaebols) were seen as limiting South Korean innovation. These perceived limits to innovation are all unique to South Korea.

The limited natural resources available in South Korea as well as the nation's economic policies were seen by respondents as spurring South Korean innovative success. South Korean economic policies have focused on making the nation more innovative and expanding the economy. South Korea has made significant economic strides in a relatively short period of time.

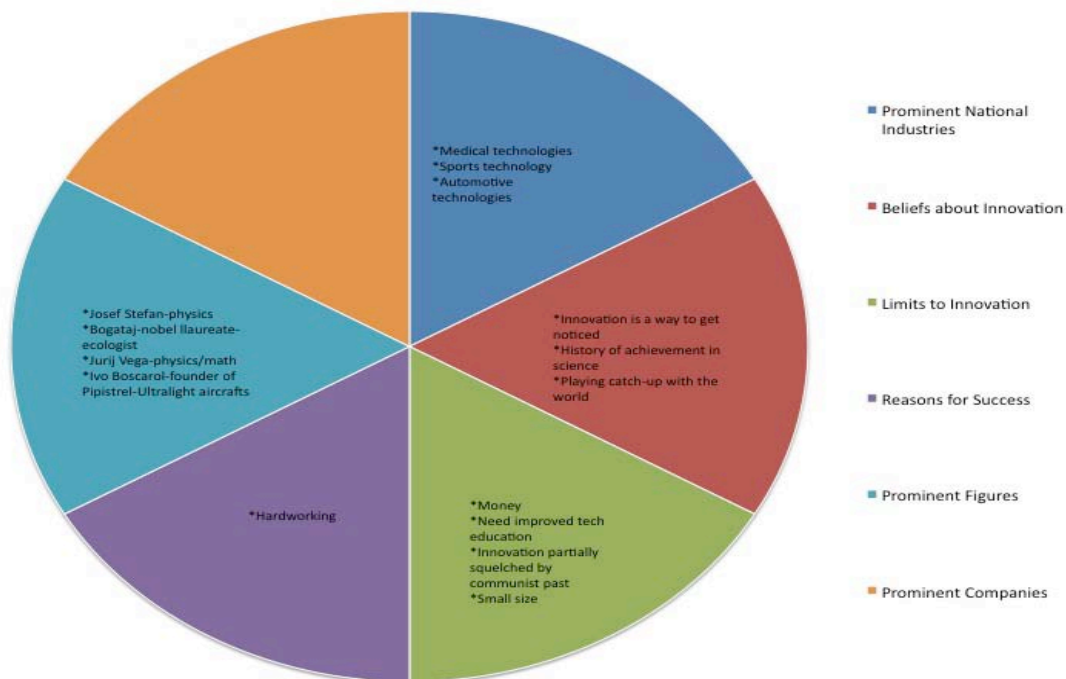
Respondents were able to routinely name a number of individuals known for innovation in science and technology, and two companies were commonly named by respondents as being innovative, LG and Samsung. Although only two companies were named, they contribute significantly to South Korean GDP and are well-known in the international community as important companies in their respective areas.

#### **Takeaway points for New Zealand**

- South Korea is one of several nations to mention a lack of natural resources as helping to spur innovation within the country. New Zealand is comparatively plentiful in resources such as arable farmland, grazing land, water and forests. It may be the case that New Zealand has historically rested on its laurels regarding innovation because agriculture and forestry supplied the country with sufficient capital.
- South Korea has built its identity as an innovator in a relatively short period of time. Respondents believed that the nation's success was due, in part, to South Korean economic policies. New Zealand should take note of what Korea has done with respect to innovation policy and apply those that might fit with the New Zealand situation.

## 4.10 Slovenia innovation model

Figure 4.9: Slovenian innovation identity



Slovenian respondents saw innovation as a way for Slovenia to get noticed in the international community. Respondents also believed the nation had a history of scientific achievement.

Respondents believed that improved technology education was needed to make the most of Slovenia's innovation potential which they believed was lagging because of the nation's communist past. The nation's small population size, a little over two million people, was also seen as a hurdle to innovation.

The notion that Slovenians were hardworking dominated in the interviews and this was seen as a reason the nation would succeed with respect to innovation.

Respondents were able to name a number of historically significant scientific figures along with one current figure, Ivo Boscarol, the general manager of Pipistrel, a Slovenian ultralight airplane company. Boscarol is involved in both the design and production of Pipistrel's ultralights.

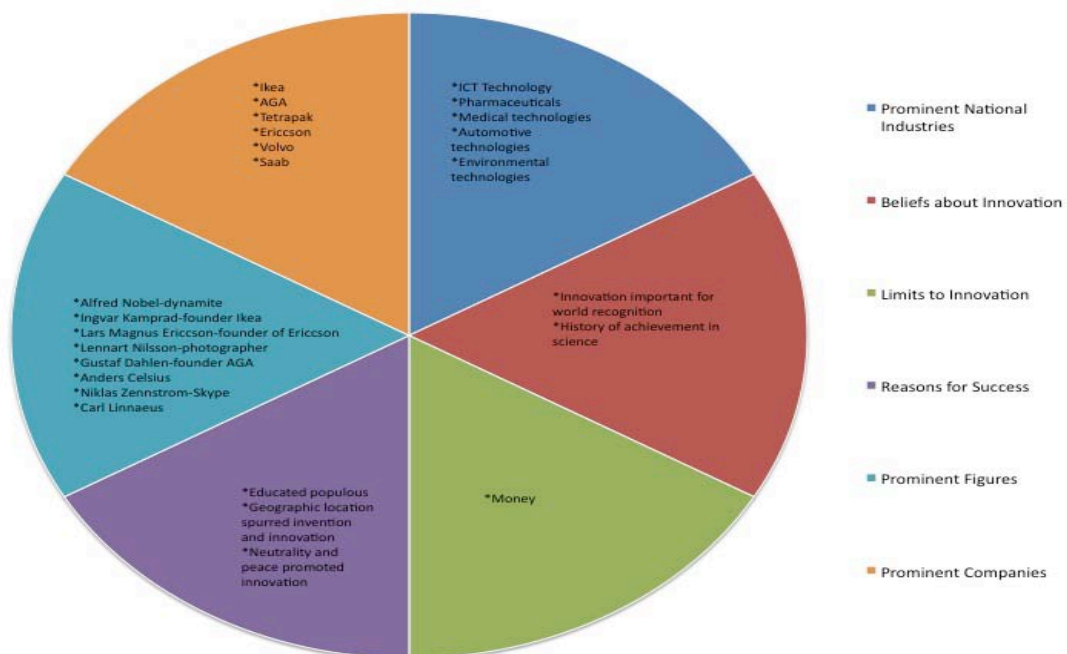
As was the case with New Zealand, it is important to note that the category for prominent companies is blank in the Slovenian model meaning that no companies showed up as significant for Slovenia's innovation identity. The absence of any companies in this category indicates the innovation landscape as measured by innovative companies is either small and/or not particularly visible in Slovenia. If companies are not visible by the national community, it is also likely that they are not visible to the international community.

## Takeaway points for New Zealand

- New Zealand respondents saw innovation as a way to keep up with the world. Slovenian respondents saw innovation as a way to get noticed in the world. The latter view is the healthier one to have if a nation hopes to become known for innovation. Work needs to be done to change New Zealander’s views on the nation’s innovation potential.
- Slovenians mentioned sports technologies as a significant industry for Slovenia. Given the importance of sports in New Zealand, venturing into sports technology could be an area where New Zealand can shine internationally. This form of technology fits in nicely with New Zealand cultural and national identity.

## 4.11 Sweden innovation model

Figure 4.10: Swedish innovation model



Swedish respondents saw innovation as a way for Sweden to receive world recognition. The only limit to Swedish innovation was money. It was believed that neutrality and peace during the World Wars helped promote innovation within Sweden as well as Sweden’s northern location which limited food production and required Sweden to trade other goods.

Swedish respondents could name a number of prominent figures involved with science and innovation. Figures ranged from the historical, Alfred Nobel, to the current, Ingvar Kamprad, the CEO of Ikea. Respondents also identified a number of Swedish companies they believed to be innovative—these ranged from the aforementioned Ikea, a furniture and home furnishing company to Volvo, an automotive company. In our other research Ikea shows up as a national symbol for Sweden (Rinne and Fairweather, 2011).

This model shows Sweden’s innovation identity to be well developed and diverse. Sweden is not innovative in one area but many.

### **Takeaway points for New Zealand**

- Sweden has a reputation as an environmental nation and has capitalized on this reputation by developing environmental technologies. A country which markets itself to tourists as clean, green and 100 per cent pure is well placed to be known for environmental-type technologies. This could be an area where New Zealand really stands out in the international community and one that already fits with the international image the nation has.
- Sweden has a significant amount of diversity with regard to innovative fields and companies that dominate in the nation. Having such a diverse portfolio is very healthy from an economic standpoint. Areas where New Zealand could shine include environmental/renewable energy technology, agricultural technology (this is already significant in New Zealand although the visibility could be significantly improved), and ICT. New Zealanders already think ICT is important as it helps them connect to the world and relieves some of the isolation that comes with being situated so far from other nations so it makes sense that this might be an area where New Zealanders can be innovative.

## Chapter 5 Innovation Models: Quantitative Data

### 5.1 Introduction

In the last chapter we examined the innovation identities of each of our chosen countries and discussed them in a qualitative manner. In this chapter, we will look at the same material but through a quantitative lens using some basic counts. This allows us to identify views commonly held across most nations and to identify what is unique to a nation. This chapter also gives close attention to what makes New Zealand's innovation identity unique and what countries are most similar to New Zealand.

### 5.2 Counts by category

This section presents counts for each category of innovation for each country studied. Table 5.1 reports counts for 'specific industries' mentioned for each country. The most cited industries were medical technologies (nine out of ten), automotive (five out of ten), and ICT (four out of ten). Medical technologies, automotive and ICT were not identified by New Zealand respondents. Across the countries, the total number of industries mentioned ranged from one to five, with most items (five) identified by respondents from Sweden and from South Korea.

**Table 5.1: Prominent industries by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
Tourism	1										1
Agriculture	1		1								2
Medical Technologies		1	1	1	1	1	1	1	1	1	9
Automotive			1	1			1	1		1	5
Sports				1							1
ICT					1	1	1			1	4
Gene Technology					1	1					2
Pulp and Paper						1					1
Pharmaceuticals							1		1		2
Environmental							1		1		2
Heavy Industry								1			1
Semiconductors										1	1
Shipbuilding										1	1
Total	2	1	3	3	3	4	5	3	3	5	32

Table 5.2 reports counts for 'beliefs about innovation' for each country and show that the most common (four out of ten countries) beliefs about innovation were 'Innovation as a way to keep up' and 'History of scientific achievement', the former also important to New Zealand. The second most cited belief about innovation was that 'Innovation is important for world recognition' (three out of ten countries). Sweden, Finland and South Korea, three top tier innovators, held this belief. Across the countries, South Korea had the most beliefs (four), followed by Slovenia and Estonia with three each.

**Table 5.2: Beliefs about innovation by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
Innovation to keep up	1	1						1	1		4
History of being resourceful	1	1									2
Innovation as a way to get noticed				1	1						2
Estonia is an ICT Powerhouse					1						1
Playing catch-up with the world				1	1						2
History of scientific achievement			1	1			1	1			4
Innovation important for world recognition						1	1			1	3
Technology is power										1	1
Technology enhances culture										1	1
Total	2	2	1	3	3	1	2	1	1	4	20

Table 5.3 reports counts for ‘limits to innovation’ mentioned for each country. All countries mentioned money as a limit to innovation with the other limits receiving a low count. Small size was the second most mentioned item (three of ten countries) identified by the three smallest countries by population size (New Zealand, Slovenia and Estonia). ‘Communist history’ was also mentioned by three of ten countries as a limit to innovation, with all former communist countries in the sample mentioning this item. Most of the other perceived ‘limits to innovation’ were unique to the country. Across countries, New Zealand, Slovenia, and Estonia mentioned the highest number of limitations, reflecting their relatively low status in terms of innovation. Innovation leaders such as Finland and Sweden mentioned only one limit to innovation.

**Table 5.3: Limits to innovation by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
Money	1	1	1	1	1	1	1	1	1	1	10
Small size of nation	1			1	1						3
Geographic Isolation	1	1									2
Pioneer values	1										1
Ends up with offshore company		1									1
Bureaucracy			1								1
Legacy of wars			1								1
Communist history				1	1			1			3
Need for education				1							1
Human resources					1						1
Corruption								1			1
Emphasis group success over individual success									1		1
Criticism of achievers	1								1		2
Conglomerates										1	1
Closed door policy (historical)										1	1
Short history of development										1	1
Total	5	3	3	4	4	1	1	3	3	4	31

Table 5.4 reports counts for reasons for innovation success and shows a range from six to one. The most mentioned item was 'educated populous' (six out of ten countries). This factor was not mentioned by New Zealand respondents. The second most mentioned item was 'limited natural resources' (four out of ten countries). Across the countries there were between one and four items identified.

**Table 5.4: Reasons for innovation success by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
Pioneer values/Resourcefulness	1	1									2
Geographic location	1	1					1				3
After war reconstruction encouraged innovation			1								1
Educated populous			1		1	1	1	1	1		6
Limited natural resources			1		1				1	1	4
Hardworking				1							1
ICT infrastructure					1						1
War reparations contributed to industrialisation						1					1
Long distance between towns encouraged communication technology						1					1
Neutrality during the wars							1				1
Craftsmanship mentality								1			1
Emphasis on group as opposed to individual success									1		1
Economic policies										1	1
Total	2	2	3	1	3	3	3	2	3	2	24

Table 5.5 reports counts for prominent figures in innovation for each country and shows that figures from the biological and physical sciences (non medical) were the most commonly mentioned (nine out of ten countries). The categories of inventors and entrepreneurs were the next most mentioned categories (four out of ten countries in each case). Across countries, there was a reasonably even spread of prominent figures mentioned although Estonia, Finland and Denmark are notable in that the respondents from these countries only identified one person.

**Table 5.5: Prominent figures in innovation by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
ICT										1	2
Physical/Biological sciences (non-medical)	1		1	1	1	1	1	1	1	1	9
Transportation technology			1								1
Medical technologies		1	1					1			2
Inventions		1						1		1	4
Entrepreneur		1		1			1	1			4
Construction			1								1
Military technology							1				1
Photography							1				1
Total	1	3	4	2	1	1	3	4	1	2	23

Table 5.6 reports counts for prominent innovative companies and shows that ICT companies were the most commonly mentioned company type. This type of company was not identified by any New Zealand respondent. ICT companies may have higher visibility than other company types. Across the countries, there was a wide range of data with Denmark having a total of six prominent companies identified and Sweden having a total of five prominent companies identified.

**Table 5.6: Prominent innovative companies by country**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea	Total
ICT					1	1	1			1	4
Government Innovation Company		1									1
Food and Beverage			1					1	1		3
Aircraft				1			1				2
Furniture							1				1
Automotive							1	1			2
Kitchen Appliances							1				1
Packaging								1			1
Clothing and shoes									1		1
Pharmaceuticals									1		1
Banking									1		1
Toys									1		1
Environmental									1		1
Total	0	1	1	1	1	1	5	3	6	1	20

## 5.4 A focus on New Zealand

Table 5.7 shows the complete list of innovation identity elements for New Zealand and which of these were shared by the other countries. Of the nine other countries surveyed, Australia shares the most innovation identity elements with New Zealand (six of 12 elements). Denmark shares the second most innovation identity elements with New Zealand (four of 12 elements). Given that Australia is the most similar to New Zealand of the countries surveyed but shares only half of New Zealand's identity elements one can arguably surmise that New Zealand has a unique innovation identity.

**Table 5.7: New Zealand innovation identity elements shared by other countries**

	New Zealand	Australia	Austria	Slovenia	Estonia	Finland	Sweden	Czech Republic	Denmark	South Korea
<b>Industries</b>										
Tourism	1									
Agriculture	1		1							
<b>Attitudes to Innovation</b>										
Innovation to keep up	1	1						1	1	
History of being resourceful	1	1								
<b>Limits to Innovation</b>										
Money	1	1	1	1	1	1	1	1	1	1
Small size of nation	1			1	1					
Geographic Isolation	1	1								
Pioneer values	1									
Criticism of achievers	1								1	
<b>Reasons for Success</b>										
Pioneer values/Resourcefulness	1	1								
Geographic location	1	1					1			
<b>Prominent Figures</b>										
Physical/Biological sciences (non-medical)	1		1	1	1	1	1	1	1	1
<b>Totals</b>	-----	6	3	3	3	2	3	3	4	2



# Chapter 6

## Conclusion

### 6.1 Introduction

The objective of the research was to devise cultural models of innovation identity for selected countries in Europe, Asia and Australasia. The main rationale for this research objective was to provide a basis for comparison across nations in order to better understand the uniqueness of New Zealand's innovation situation. Data were obtained from ten countries using either CASI or an internet survey, and the data were analysed both qualitatively and quantitatively.

### 6.2 Summary of key results

The results for the innovation model for New Zealand showed that:

- People believed that New Zealanders were resourceful and this was in part derived from the nation's isolation.
- Distance from other nations had positive and negative effects on innovation.
- Innovation was seen as a way to keep up with other nations.
- Few prominent figures were identified, despite people thinking that New Zealanders were inventive.
- No prominent companies were identified.

Comparing the overseas models of innovation identity to the model for New Zealand showed that:

- Australia has a similar innovation identity compared to New Zealand, but it appears to be healthier. Further, respondents recognized CSIRO, a government sponsored innovation institution as being an innovative Australian company unlike the Crown Research Institutes within New Zealand.
- Compared to most other countries, New Zealand respondents did not appreciate that education was important for innovation success.
- Some countries (Denmark and Sweden) are already recognised as environmental nations with environmental-type innovations. This suggests that New Zealand, a nation with a clean, green national identity, has potential to also achieve similar recognition with respect to environmental-type innovations.
- New Zealanders see innovation as a way to keep up with the world while many other countries see innovation as a way to get noticed or to achieve world recognition.
- Comparisons to Finland show that lacking a history of science and being small are not insurmountable barriers to being innovative, and comparisons to South Korea suggest that economic policy can be effective in bringing about changes in innovation in a short period of time.
- Comparisons to Slovenia suggest that sport technologies may have the potential to be the basis of a significant export industry.

The quantitative data showed that:

- Respondents saw only tourism and agriculture as innovative industries within New Zealand. Across the other countries studied, the most common industries identified as innovative were medical, automotive and ICT.
- New Zealand along with Australia, Czech Republic and Denmark saw innovation as a means to keep up with the world. The second most cited belief was that a country possessed 'a history of scientific achievement' although this belief was not present in New Zealand.
- New Zealand was similar to Estonia and Slovenia in mentioning small size as a limit to innovation, and these three countries reported the most limits to innovation.
- New Zealand was distinctive in not mentioning educated populous as a reason for success in innovation, and this reason was the most frequently reported reason for success across nearly all European countries.
- Sweden and Denmark reported the largest number of prominent companies in innovation: in contrast there were none mentioned by New Zealand respondents.
- Comparing New Zealand innovation elements with all the other countries showed greatest similarity with Australia with six of 12 elements shared.

Comparing the results from the qualitative analysis and the quantitative analysis shows some good correspondence. Both data sets show that:

- New Zealand has greatest similarity to Australia
- New Zealand was distinctive in not mentioning education as a reason for success in innovation.

### **6.3 Discussion of results**

The overall results show that there is little evidence that the governmental initiatives discussed by Skilling (2010) seeking to promote innovation as a part of New Zealand national identity were actually embedding the idea into the public's consciousness. It would seem that people in New Zealand are not particularly tuned in to the role of innovation in economic growth. They mentioned very few prominent figures and no prominent companies. At issue here is whether this is an accurate reflection of prominent figures and companies, implying that New Zealand is not strong on these characteristics, or whether it is a reflection of lack of awareness of prominent figures and companies. It would seem that even for science, New Zealand has a number of prominent figures aside from Ernest Rutherford, and we can point to Alan MacDiarmid, co-winner of the 2000 Nobel Prize in Chemistry, William Pickering, central figure and pioneer of NASA space exploration, Sir Paul Callaghan, physicist and founding director of the MacDiarmid Institute for Advanced Materials and Nanotechnology at Victoria University of Wellington, and Sir Peter Gluckman, the first Chief Science Advisor to the New Zealand Prime Minister. These latter two scientists have public roles that give them more media coverage than other scientists and yet they have not entered the public consciousness sufficiently to be recalled as prominent scientists.

We suspect it is not so much a lack of scientists or scientific achievement that is at issue but how this endeavour is recognised by New Zealanders. Given the strong anti-intellectual currents in New Zealand society (Smithies, 2008) it is more likely that scientists and science achievement are not recognised and not celebrated. The results above show clearly the low emphasis given to education and its role in innovation and this is symptomatic of anti-intellectualism. In terms of explaining this situation, our analysis of results from the CASI data from New Zealand schools offers an explanation (Rinne and Fairweather, in press). Comparison of the model of New Zealand culture and the model of New Zealand national identity shows that there is an absence of inventiveness and innovativeness in New Zealanders' model of national identity except for social innovation (e.g., women's suffrage

nuclear free etc.). More relevant to national identity is sport, lifestyle and landscape/environment. It is hardly surprising that important scientists were not identified.

## **6.4 Policy implications**

Based on the cross-cultural analysis presented in this report, New Zealand has a unique innovation identity. It shares only half of its innovation identity elements with Australia. The uniqueness of New Zealand's situation should be considered when devising innovation policy for New Zealand as what has worked elsewhere may not work as intended within New Zealand.

Respondents from the top innovation performing countries mentioned the quality of the educational system as being a key to their success. While the New Zealand education system performs highly in international comparisons and is likely on par with these top performing nations, pride in education and educational achievement could be greatly improved within New Zealand.

Within New Zealand there is a lack of awareness of innovation. Prominent figures and companies are not known. The research showed little evidence that those governmental initiatives discussed by Skilling (2010) seeking to promote innovation as a part of New Zealand national identity were actually embedding the idea into the public's consciousness. Further, one could argue that the people of a nation must first recognize the nation as innovative before the world is likely to give the nation any recognition in this regard.

Within the prominent figures categories for all the countries analyzed, technology user inventors were infrequently mentioned. Public awareness of these important sources of invention could be greatly increased, particularly in New Zealand where prior research has shown these types of innovators to be closely allied with New Zealand cultural identity (Rinne and Fairweather, in press).

The New Zealand innovation landscape may be better served by consolidating the many CRIs into fewer larger organizations to gain more prominence in the public sphere creating an institute similar to Australia's CSIRO which has comparatively high public recognition.

## **6.5 Future research**

Based on the findings from this report there are a number of areas for future research.

- Only one Asian nation was included in this report. Other Asian nations that might be of interest include Taiwan, Singapore and Malaysia. Each of these countries has made a name for itself with respect to innovation and has done so in a relatively short period of time. Although most New Zealanders are of European heritage, the nation is located in the Pacific Rim and learning about the innovation identity of prospective competitors and trading partners within the Pacific Rim would be very useful.
- A large part of the New Zealand economy is centred on agriculture. Research on other countries that once had an agricultural focus but have diversified would be useful. A potential country of interest is Ireland.
- This study suggests that New Zealanders are unaware of the innovators in New Zealand. A comparative media study looking at how often and in what context, innovation is discussed in newspapers and on TV across multiple nations could prove enlightening. Perhaps the press in other nations do a better job of highlighting national innovation.



## References

- Andrew, J. P., E.S. DeRocco and A. Taylor (2009) *The Innovation Imperative in Manufacturing: How the United States Can Restore its Edge*, The Boston Consulting Group, Boston.
- Blalock H. M. (1972), *Social Statistics*. McGraw Hill, New York.
- Blount, B. G. (2002) *Keywords, Cultural Models, and Representations of Knowledge: A Case Study from the Georgia Coast*, Coastal Anthropology Resources Laboratory Occasional Publication Number 3. Athens, GA: University of Georgia Department of Anthropology.
- CIA World Factbook (2011) <https://www.cia.gov/library/publications/the-world-factbook/>.
- D'Andrade, R. (1984) *Cultural Meaning Systems*, in R. A. Schweder & R. A. Levine (Eds), *Culture Theory: Essays on Mind, Self, and Emotion*, Cambridge: Cambridge University Press:88-119.
- Fairweather, J.R., Wintjes, R., Williams, J., Rinne, T., and Nauwelaers, C. (2010). *Comparison of innovation policies in selected European, Asian, and Pacific Rim Countries: How best to optimise innovation governance in New Zealand?* AERU Report No. 321, Lincoln University.
- Fairweather, J. R., and Rinne T. (in press), *Clarifying a basis for qualitative generalisation using approaches which identify shared culture*. *Qualitative Research*.
- Gobo, G. (2009) *Re-conceptualizing generalization: old issues in a new frame*. in Alasuutari P. Bickman L. and Brannen J. (eds.), *The Sage Handbook of Social Research Methods*. Los Angeles: Sage:193-213.
- Hasan, H. and G. Ditsa (1999) *The impact of culture on the adoption of IT: An interpretive study*, *Journal of Global Information Management* 7(1):5-15.
- Herbig, P.A. and Miller, J.C. (1992) *Culture and technology: Does the traffic move in both directions?*, *Journal of Global Marketing* 6(3):75-104.
- INSEAD (2009) *Global Innovation Index 2008-2009*, INSEAD, New York.
- James, A. (2005) *Demystifying the role of culture in innovative regional economies*, *Regional Studies*, 39 (9):1197-1216.
- Pro Inno Europe (2009) *European Innovation Scoreboard 2008: Comparative Analysis of Innovation Performance*, UNU-MERIT, Maastricht.
- Rinne, T and Fairweather, J.R. (in press) *Modelling cultural, national and innovation identities In order to understand New Zealand's modest innovation performance*. *Sites*.
- Saxenian, A. (1994) *Regional advantage: Culture and competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press.
- Schein, E. (1992). *Organizational culture and leadership*, 2nd Edition. San Francisco, CA: Jossey-Boss.
- Schoenberger, E. (1994). *Corporate strategy and corporate strategists: Power, identity and knowledge with the firm*. *Environment and Planning A* 26 (3): 435-451.

Smithies, J. (2008), Post-War New Zealand Literary Critique. *Thesis Eleven* 92 (1): 87-107.

Skilling, P. (2010). The construction and use of national identity in contemporary New Zealand political discourse. *Australian Journal of Political Science* 45 (2): 175-189.

# Appendix 1

## Open-Ended Questions for Computer-Assisted Survey

### Agribusiness and Economics Research Unit

PO Box 84, Lincoln University  
Canterbury 8150, New Zealand

Telephone 64 3 321-8291  
Facsimile 64 3 325-3847

[www.lincoln.ac.nz](http://www.lincoln.ac.nz)

E-mail: [John.Fairweather@lincoln.ac.nz](mailto:John.Fairweather@lincoln.ac.nz)

**Dear Respondents,**

The study in which you are about to participate is part of a research programme at Lincoln University in New Zealand in which innovation is being studied across multiple nations. The following interview is divided into four sections. The first three sections ask about culture, national identity and innovation, respectively. In the fourth section, a series of scales are given and you are asked to indicate either level of agreement with, or importance of, a given statement. None of the questions posed in any of the four sections have a right or wrong answer. We are merely seeking your opinion.

We appreciate you taking time out of your schedule to aid us in our research.

**Sincerely,**

**Dr. John Fairweather and Dr. Tiffany Rinne.**

### **Instructions:**

1. Please complete this computer-based interview in one sitting and keep track of the time spent in completing the interview. At the end of the interview we ask you to record this time.
2. We ask that you do not use additional resources (friends, the internet, reference books) to answer any of the questions. We are seeking information about your opinions and thoughts—things that are on the top of your mind.
3. Please take care to answer each question completely. Some questions have multiple components.
4. Please answer each question as fully as possible, keeping in mind that the researcher analysing the interviews is not a citizen of your country and therefore will not necessarily be aware of the significances of certain events, people, or ideas.
5. We would prefer your answers to be in **English** but if you find you have to use your **own language**, please do so.
6. Upon completion of the interview, please e-mail the interview as an attachment to [tiffanyrinne76@gmail.com](mailto:tiffanyrinne76@gmail.com)

**Culture** - A culture is a way of life of a group of people--the behaviours, beliefs, values, and symbols that they accept, generally without thinking about them, and that are passed along by communication and imitation from one generation to the next.

1. Please name five popular people that you consider represent your country's true values or ideals. After each name please describe what values or ideals each person represents.
2. Please name five important symbols used in your country's culture, as a whole. What does each symbol represent?
3. Please give five examples of sayings/phrases that best reflect your country's culture. What does this saying/phrase mean?
4. Please give five examples of important historical events that have influenced your country's culture. What is the significance of each historical event?
5. What role does technology play in your country's culture? Please explain how technology is significant or not significant.
6. Who are important people in science and technology within your country? What are they known for?
7. What role does sport play in your country's culture? Please explain how sport is significant or not significant.
8. What role do the 'arts' play in your country's culture? By the 'arts' we mean music, theatre, dance, movies, painting, writing, sculpture etc. Please explain how the 'arts' are significant or not significant.
9. Who are important people in sports for your country? What are they known for?
10. Who are important people in the arts for your country? What are they known for?
11. If you had to describe your country's culture using five words or phrases to best characterize it what would they be?

---

**National Identity** - National identity derives from the image citizens have of their country and the nation's perceived or actual international image in world opinion.

12. How would you characterize your country's national identity?
13. How do you think your country is identified internationally?
14. What are the things you like most about living in your country? Please name at least five positives about living in your country.
15. What are the things you like least about living in your country? Please name at least five negatives about living in your country.
16. What historical events played an important part in the formation of your country's national identity? Please explain how each event influenced national identity.
17. What sporting achievements are important to your country's national identity? Why are these achievements important?
18. What arts achievements are important to your country's national identity? Why are these achievements important?
19. What science and technology achievements are important to your country's national identity? Why are these achievements important?
20. What kind of political influence does your country have in the international community? Is this an important factor in national identity? Why or why not?
21. How significant is your country's military to national identity? In what way is the military significant or not significant for national identity?
22. How would you like your country's military to be utilized?
23. If you had to describe your country using five words or phrases what would they be?

---

**Innovation** - A new idea, system, method, or device that is brought to market

24. How important is innovation and technology to your country? Please explain how it is significant or not significant?
25. Do you think that the average citizen of your country is technologically knowledgeable? What improvements could be made?
26. What are five characteristics (personality attributes) of your country's citizens that you think make them good at innovation? These would be characteristics possessed by a majority of citizens.
27. What are five characteristics (personality attributes) of your country's citizens that would constrain innovation? These would be characteristics possessed by a majority of citizens.
28. Has your country's history influenced your country's innovation in any way? Please explain.
29. What are some significant sectors, companies or products that have been innovative within your country? Please explain how each has been innovative (inventive ideas/processes/products, inventive business planning, innovative marketing, design).
30. Is your place of work innovative? If so, in what ways?
31. Would you feel comfortable talking with your boss about ideas you may have regarding ways to innovate? Why or why not?
32. Have you ever invented anything or known someone who has? If so, what was it and was it successful?
33. Would producing an invention be something you could see yourself doing in the future? What would stop you from trying to invent something?
34. Where does most innovation occur in your country? For example, does it occur in businesses, research institutes, universities, or people's backyard?
35. How easy would it be for an individual with an invention to bring it to market? What impediments would they face?
36. What are the main factors that would drive a person to invent something and bring it to market?
37. Do you consider invention to be a good way to enhance an individual's financial situation? Why or why not?
38. Are you aware of any government policies to support innovation within your country? If so, what are they and are they effective?
39. Do you think other countries consider your country to be innovative? If yes, in what way?
40. Please name the five countries that you consider to be the most innovative in the world. Taking each country in turn, why do you consider each of these nations to be innovative?
41. How does your country compare to these top innovators with regards to innovation?
42. What are specific areas in which your country is not as innovative as other nations?

### Demographic Questions

1. Are you Male or Female?  
 Male  
 Female
2. What is your date of birth? \_\_\_\_\_
3. What is the highest level of education you have completed?  
 Less than high school  
 Lower High school  
 Upper High School  
 Trade/Vocational/Technical  
 University
4. What is your occupation? \_\_\_\_\_
5. Are you in paid employment? \_\_\_\_\_

6. If yes, for you alone, what is your approximate monthly income? (please include the currency)-  
\_\_\_\_\_
7. What is your approximate household income? (please include the currency)\_\_\_\_\_
8. What is your primary language/mother tongue?\_\_\_\_\_
9. To which national culture do you most identify? \_\_\_\_\_
10. How long have you been living in the country where you now live? \_\_\_\_\_
11. How long did it take you to complete this computer-based interview? \_\_\_\_\_

## **Appendix 2**

### **Open-Ended Questions for Qualtrics Survey**

**Agribusiness and Economics Research Unit**

PO Box 84, Lincoln University  
Canterbury 8150, New Zealand

Telephone 64 3 321-8291  
Facsimile 64 3 325-3847

**[www.lincoln.ac.nz](http://www.lincoln.ac.nz)**

**E-mail: [John.Fairweather@lincoln.ac.nz](mailto:John.Fairweather@lincoln.ac.nz)**

**Dear Respondents,**

The study in which you are about to participate is part of a research programme at Lincoln University in New Zealand in which innovation is being studied across multiple nations. The following interview is divided into four sections. The first three sections ask about culture, national identity and innovation, respectively. In the fourth section, a series of scales are given and you are asked to indicate either level of agreement with, or importance of, a given statement. None of the questions posed in any of the four sections have a right or wrong answer. We are merely seeking your opinion.

We appreciate you taking time out of your schedule to aid us in our research.

**Sincerely,**

**Dr. John Fairweather and Dr. Tiffany Rinne.**

#### **Instructions:**

1. You may respond in your own language or in English.
2. Please complete this computer-based interview in one sitting and keep track of the time spent in completing the interview. At the end of the interview we ask you to record this time.
3. We ask that you do not use additional resources (friends, the internet, reference books) to answer any of the questions. We are seeking information about your opinions and thoughts—things that are on the top of your mind.
4. Please take care to answer each question completely. Some questions have multiple components.
5. Please answer each question as comprehensively as possible, keeping in mind that the researcher analysing the interviews is not a citizen of your country and therefore will not necessarily be aware of the significances of certain events, people, or ideas.
6. If you have any questions about the interview, please e-mail [tiffanyrinne76@gmail.com](mailto:tiffanyrinne76@gmail.com) for clarification.
7. Upon completion of the interview, please e-mail the interview as an attachment to [tiffanyrinne76@gmail.com](mailto:tiffanyrinne76@gmail.com).

**Culture** - A culture is a way of life of a group of people--the behaviours, beliefs, values, and symbols that they accept, generally without thinking about them, and that are passed along by communication and imitation from one generation to the next.

1. Please name five popular people that you consider represent your country's true values or ideals. After each name please describe what values or ideals each person represents.
2. Please name five important symbols used in your country's culture, as a whole. What do each of these symbols represent?
3. Please give five examples of important historical happenings that have influenced your country's culture. Include a brief statement of the significance of each historical event for culture.
4. What role does technology play in your country's culture? Please explain why you think technology is significant or not significant.
5. Who are important people in science and technology within your country? What are they known for?
6. If you had to describe your country's culture using five words or phrases to best characterize it what would they be?

---

**National Identity** - National identity derives from the image citizens have of their country and the nation's perceived or actual international image in world opinion.

7. How would you characterize your country's national identity?
8. How do you think your country is identified internationally?
9. What are the things you like most about living in your country? Please name at least five positives about living in your country.
10. What are the things you like least about living in your country? Please name at least five negatives about living in your country.
11. What are achievements in science and technology that are important to your country's national identity? Why are these achievements important?
12. What kind of political influence do you feel your country has in the international community? Is this an important factor in national identity? Why or why not?

---

**Innovation** - A new idea, system, method, or device that is brought to market

13. How important is innovation and technology to your country? Please explain why it is significant or not significant?
14. Has your country's history influenced your country's innovation in any way? Please explain.
15. How easy would it be for an individual with an invention to bring it to market? What impediments would they face?
16. What are the main factors that would drive a person to invent something and bring it to market?
17. Do you think other countries consider your country to be innovative? In what way?
18. Please name the five countries that you consider to be the most innovative in the world. Taking each country in turn, why do you consider each of these nations to be innovative?

### Demographic Questions

19. Are you Male or Female?  
\_\_\_\_\_ Male  
\_\_\_\_\_ Female
20. What is your date of birth? \_\_\_\_\_

21. What is the highest level of education you have completed?
- Less than high school
  - Lower High school
  - Upper High School
  - Trade/Vocational/Technical
  - University
22. For you alone, what is your approximate monthly income? (please include the currency)-  
\_\_\_\_\_
23. What is your approximate household income? (please include the currency)-  
\_\_\_\_\_
24. What is your primary language/mother tongue? \_\_\_\_\_
25. To which national culture do you most identify? \_\_\_\_\_
26. How long have you been living in the country where you now live? \_\_\_\_\_
9. How long did it take you to complete this computer-based interview? \_\_\_\_\_



## RESEARCH REPORTS:

---

- 295 Why do some of the Public Reject Novel Scientific Technologies? A Synthesis of Results from the Fate of Biotechnology Research**  
Fairweather, J., Campbell, H., Hunt, L. and Cook, A. 2007
- 296 Preliminary Economic Evaluation of Biopharming in New Zealand**  
Kaye-Blake, W., Saunders, C. and Ferguson, L. 2007
- 297 Comparative Energy and Greenhouse Gas Emissions of New Zealand's and the UK's Dairy Industry**  
Saunders, Caroline and Barber, Andrew 2007
- 298 Amenity Values of Spring Fed Streams and Rivers in Canterbury, New Zealand: A Methodological Exploration**  
Kerr, Geoffrey N. and Swaffield, Simon R. 2007
- 299 Air Freight Transport of Fresh Fruit and Vegetables**  
Saunders, Caroline and Hayes, Peter 2007
- 300 Rural Population and Farm Labour Change**  
Mulet-Marquis, Stephanie and Fairweather, John R. 2008
- 301 New Zealand Farm Structure Change and Intensification**  
Mulet-Marquis, Stephanie and Fairweather, John R. 2008
- 302 A Bioeconomic Model of Californian Thistle in New Zealand Sheep Farming**  
Kaye-Blake, W. and Bhubaneswor, D. 2008
- 303 The Impact of Wilding Trees on Indigenous Biodiversity: A Choice Modelling Study**  
Kerr, Geoffrey N. and Sharp, Basil M.H. 2007
- 304 Cultural Models of GE Agriculture in the United States (Georgia) and New Zealand (Canterbury)**  
Rinne, Tiffany 2008
- 305 Farmer Level Marketing: Case Studies in the South Island, of New Zealand**  
Bowmar, Ross K. 2008
- 306 The Socio Economic Status of the South Island High country**  
Greer, Glen 2008
- 307 Potential Impacts of Biopharming on New Zealand: Results from the Lincoln Trade and Environment Model**  
Kaye-Blake, William, Saunders, Caroline, de Arãgao Pereira, Mariana 2008
- 308 The Key Elements of Success and Failure in the NZ Sheep Meat Industry from 1980 - 2007**  
McDermott, A., Saunders, C., Zellman, E., Hope, T. and Fisher, A. 2008
- 309 Public Opinion on Freshwater Issues and Management in Canterbury**  
Cook, Andrew 2008
- 310 Biodiversity Management: Lake Rotoiti Choice Modelling Study**  
Kerr, Geoffrey N. and Sharp, Basil N.H. 2008
- 311 The Key Elements of Success and Failure in the NZ Kiwifruit Industry**  
Kilgour, M., Saunders, C., Scrimgeour, F. and Zellman, E. 2008
- 312 The Key Elements of Success and Failure in the NZ Venison Industry**  
Shadbolt, N.M., McDermott, A., Williams, C., Payne, T., Walters, D. and Xu, Y. 2008
- 313 The Key Elements of Success and Failure in the NZ Dairy Industry**  
Conforte, D., Garnevska, E., Kilgour, M., Locke, S. and Scrimgeour, F. 2008
- 314 A Review of Research on Economic Impacts of Climate Change**  
Kaye-Blake, W., Greenhalgh, S., Turner, J., Holbek, E., Sinclair, R., Matunga, T. and Saunders, C. 2009
- 315 Managerial Factors in Primary Production: Data from a sample of New Zealand Farmers with an Emphasis on Experience as a Factor in Success**  
Nuthall, Peter 2009
- 316 Modelling Climate Change Impacts on Agriculture and Forestry with the extended LTEM (Lincoln Trade and Environment Model)**  
Saunders, C., Kaye-Blake, W. and Turner, J. 2009
- 317 Economic Strategy Issues for the New Zealand Region in the Global Economy**  
Saunders, Caroline, Dalziel, Paul and Kaye-Blake, William 2009
- 318 Multi-agent Simulation Models in Agriculture: A Review of their Construction and Uses**  
Kaye-Blake, W., Li, F. Y., Martin, A. M., McDermott, A., Rains, S., Sinclair, S. and Kira, A. 2010
- 319 Sustainability Trends in Key Overseas Markets: Market Drivers and Implications to Increase Value for New Zealand Exports**  
Saunders, C., Guenther, M. and Driver, T. 2010
- 320 The Socio-technical Networks of Technology Users' Innovation in New Zealand: A Fuzzy-set Qualitative Comparative Analysis**  
Lambert, S. and Fairweather, J.R. 2010
- 321 Comparison of Innovation Policies in selected European, Asian, and Pacific Rim Countries: How to best to optimise Innovation Governance in New Zealand**  
Fairweather, J., Wintjes, R., Williams, J., Rinne, T. and Nauwelaers, C. 2011
- 322** Not published yet.

