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碩士論文

企業家精神以及創新力在經濟發展中所扮演的角色,愛爾蘭與台灣的面貌



**The Role of Entrepreneurship and Innovation in
Economic Development, A look at Ireland and Taiwan**

研究生：歐瑞秋

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中華民國九十七年五月

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The Role of Entrepreneurship and Innovation in Economic Development, A look at Ireland and Taiwan

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Abstract:

Entrepreneurship involves mobilizing resources in pursuit of opportunities in the founding of new businesses (Aldrich, 1990). Entrepreneurs and small business owners add to the innovation of an economy therefore initiating entrepreneurship is key to the level of economic growth in terms of productivity and per capita incomes (Acs, Carlsson and Karlsson, 1999). This paper aims to look at two successful economies Ireland and Taiwan, and analyze the driving forces behind the success of each economy by looking at the entrepreneurial behavior and innovation in society using modified elements of Porter's Diamond.

Entrepreneurship is well accepted as an important contributor to economic growth, employment, innovation and competitiveness. Studies have attempted to explain the creation of new ventures from a number of different theoretical perspectives such as economics (Brenner, 1987), psychology (Katz, 1992; Bird, 1992) and population ecology (Aldrich, 1990) while these perspectives are different they share some common characteristics. Such as agreeing that a business opportunity will result in some value focused on the individual entrepreneur, secondly the circumstances or environment that supports business venturing and the timing of the events involved in the process is

important, thirdly that the venture creation process differs depending on the types of ventures, i.e., technology-based or non-technology-based.

Wennekers and Thurik (1999) attribute economic growth through entrepreneurship to three main processes or entrepreneurial activities, enhanced competition, innovations, and employment growth through firm start-ups. Knowledge and flexibility are also described as key factors in entrepreneurship, knowledge is a factor of production characterized by uncertainty and the flexibility of the entrepreneur becomes the ability to adapt to changes in the economy.

Policy makers on the island of Ireland and the island of Taiwan have increasingly focused on the importance of fostering innovation and an environment that is supportive to entrepreneurship. This report looks at the two successful innovative countries; Ireland and Taiwan and how they compare in different areas of innovation and entrepreneurship. In 2007 Ireland's market growth reached 5% while Taiwan's rose to 5.5%. This shows the opportunities that have been created and the effort the government is putting in to achieve the goal of moving into a more knowledge based economy. Both countries have shown immense competitiveness and forward thinking and continue to make provisions to evolve and improve.

Ireland aims to use its knowledge for economic and social progress within an innovation driven economy and is planning to become internationally renowned for the excellence of its research. Similarly Taiwan's plan to become more innovative has been spurred on by its incredible levels of competitiveness and forward thinking. Both countries can attribute much of their success to the strength of their education, research, innovation, strength of human capital and positive attitude to strive for success.

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1. Introduction

Entrepreneurship has increasingly become more important and a key factor on the agenda for many policy makers around the world. Entrepreneurial potential can give an economy an innovative advantage and promote technological leadership and change throughout that economy. Entrepreneurship sometimes poses a degree of uncertainty and risk but also offers opportunities for technological progression in a society.

Ireland has a leading position in Europe regarding its entry-level entrepreneurial activity and Taiwan has made great strides over the last number of years and its entrepreneurial activity has been increasing. Factors which are believed to affect the participation in entrepreneurial activity relate in many ways to the perception of opportunities within the environment, a belief in the skills needed to be able to successfully start a new enterprise, having recent entrepreneurs as role models within personal networks and a reduced reluctance to become involved in entrepreneurial activity through a fear of failure.

This paper aims to look at the progress of the economy over the last number of years in areas surrounding entrepreneurship in Ireland and Taiwan and how innovation is perceived and encouraged. Taiwan and Ireland are similar in the fact that both rely heavily on their export markets and both countries have made pioneering economic developments recently. This paper will study the individual countries and the entrepreneurial environments while attempting to offer an insight into the views, obstacles and successes that have occurred. The strength of the economy is a key factor in creating opportunities for new enterprises as well as population, demographics, financing, migration, experience, economic issues, government regulations, educational factors and most importantly mindset. This paper aims to give an analysis of the current situation, the factors leading to this state and the possible lessons that can be learnt.

1.1 Aims of Study

The aim of this study is to analyze the entrepreneurial environment and innovation in both Ireland and Taiwan and present a report of the trends and current situation as it stands in 2008 using the elements of Porters Diamond as a guideline. I plan to analyze the current state of innovation in both Ireland and Taiwan and the factors leading to and promoting entrepreneurship in both countries. There are many facets to the areas of entrepreneurship and innovation and many more elements that lead to a successful economy. Ireland and Taiwan have been compared to each other on many levels as both have experienced accelerated economic growth over the last few years. With this report I plan to look at each country on some of these levels and determine an overall deeper understanding of the state of entrepreneurship and innovation in both countries and the factors that have attributed to it.

1.2 Problem Statement



It is important that Ireland and Taiwan's Entrepreneurs continue to increase in numbers and that the economies can remain competitive in today's global marketplace. The relatively new emphasis on entrepreneurs in Ireland and Taiwan has been the culmination of years of government policies and educational changes in both countries that has lifted the economies from decades of poverty to modern day prosperity. As has been proved in both these countries entrepreneurship and innovation incubated correctly can bring increased success to an economy. Initial investigation showed that both countries have relatively high levels of innovation as compared to other countries in their regions and that both economies have become more knowledge focused with an increased number of Small to Medium size Enterprises.

The following problem statement has been used to guide this research work:

What is the role of entrepreneurship and innovation in economic development and what are the comparisons between Taiwan and Ireland in this area?

There are two components to this question; firstly the nature of the individual economies, histories and policies that have shaped society and secondly, the issue of how Ireland and Taiwan relate to each other in terms of their new prosperity.

1.3 Methodology

There are many explanations regarding the success or failure of entrepreneurship in a society. (Aldrich 1990) argues that the entrepreneur is treated as an agent who creates an organization to exploit the resources within a given opportunity structure.

This paper will focus on the macro economic environmental improvements of Ireland and Taiwan over the last few years, and the innovation and entrepreneurship that exists in both countries, which has helped fuel economic growth. (Porter 1990) Implies that “countries do not trade—companies do.” This suggests that the entrepreneurs in an economy are extremely important to help in building up that economy and accelerating its economic development. Porter’s diamond model refers to the comparative advantage of nations and offers a model that can help to understand the competitive position of a nation in global competition. Porter argues that sustained industrial growth results from clusters or groups of interconnected firms, suppliers, related industries and institutions that arise in particular locations. These elements influenced by the nations government as well as chance events come together to create an environment, which enables firms to compete.

Porter's Diamond

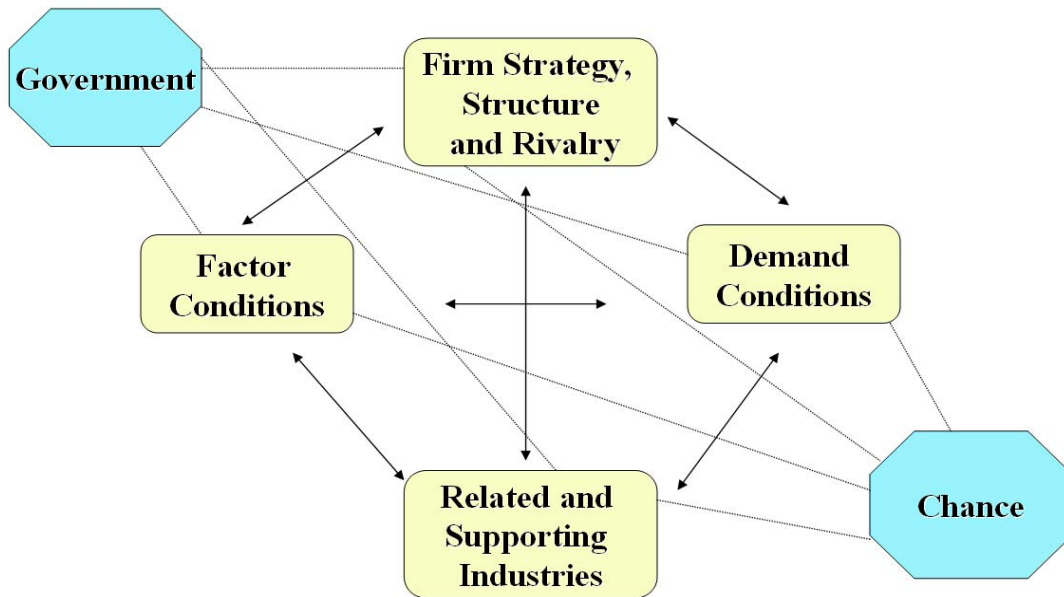


Figure 1-1 Porter's Diamond Model

Entrepreneurship relies on innovation, foresight and a little risk, which are also key success factors for international success. As an economy an essential goal is to reach a level of international success, which will bring with it many benefits to the country and the society as a whole. This paper will analyze entrepreneurship and innovation in the economies of Ireland and Taiwan using modified elements of Porters diamond model as a guideline to understanding the level of successful entrepreneurship and innovation in each society. The new model will consist of four elements that will encompass more entrepreneurial focused factors in order to gain a better understanding of how important entrepreneurship is in the Economic development of a country.

The first element of Porter's strategy is Firm Strategy, Structure and Rivalry, if this is adopted for entrepreneurship it becomes clear that it is important to explore entrepreneurial strategy and how the country encourages entrepreneurship, aswell as economic structure such as how the economy makes provisions for the entrepreneurs, and the rivalry that exists in the economy. The next of Porter's conditions is Demand

Conditions, in this section the model has been adapted to analyze the sophistication of customers and how that stimulates innovation in the economy and secondly what effects society has on the levels of entrepreneurship and innovation. The third element of Porter's diamond is Related and Supporting Industries, in this section it has been modified to determine how each economy has utilized clusters and networks in building up their economy and promoting new start ups. The fourth element on the diamond for Porter was Factor Conditions, this has been modified to discover the factors in society that effect entrepreneurs, how each country has grown their economy, the efforts each country has made to move to a more knowledge based economy, and what the general characteristics of an entrepreneur are? Porter acknowledges that all of this is affected by government and chance events, chance events are a part of everyday life and this area is too broad to include in this study of entrepreneurship as for almost every entrepreneur, successful or not there has been some chance event that has occurred. Therefore I have analyzed the effects the government has had through their policies, regulations, laws and incentives to encourage entrepreneurship.

Modified Diamond

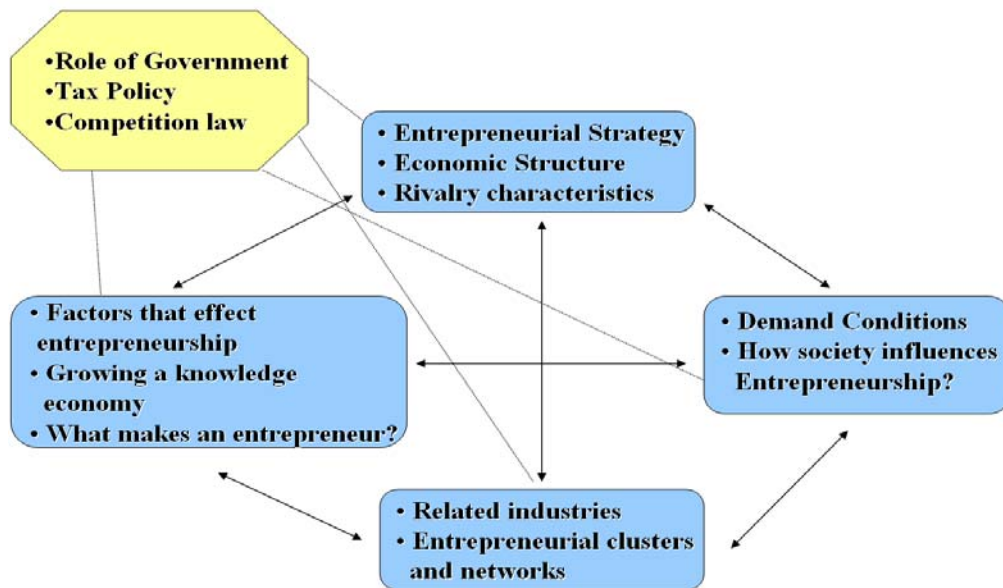


Figure 1-2 Porter's Modified Diamond

Research will come from a number of academic and scholarly articles written over the last decade, related to this subject. Special focus will be placed on the current situation and information from the recent past. National and international reports will be used as the most up to date information retrieval sources as well as published articles, books, news reports, government websites, organizational websites and studies.

To get a more complete understanding of the feelings towards entrepreneurship and innovation a questionnaire will be conducted to analyze the different attitudes, feelings and the perception of entrepreneurship and innovation in both societies. The questionnaire will gather information from ordinary Taiwanese and Irish people of different ages, educational backgrounds and careers to get an unofficial perspective about their feelings towards the innovativeness of their country and the entrepreneurs in each society. The questionnaire will be analyzed using all the respondents from a particular country. The analysis will be completed using statistical analysis tools. (See Appendix 4 for Questionnaire)



2 Background Information

2.1 Background Information - Ireland

Ireland has had a reputation over the past few hundred years as being a county with hardships. People throughout Europe enjoyed a reasonable standard of living while the people in Ireland lagged behind. The Introduction of the Single European Act in 1987 gave Ireland hope in economic terms as times before that had been hard for most. Ireland lacked confidence in competing at an international level and so growth in this area was slow. Business had access to a much larger market and the country no longer had to depend on the UK. In 1987 Ireland's economy was having real problems and was close to economic disaster. Ireland needed to attract foreign investment and become a location for international companies as a low cost manufacturing base. The EU really helped Ireland to recover from its economic bleakness as it offered an opportunity for Ireland to position itself as a feasible base for large manufacturers exporting to Europe. The EU was trying to create a single market by removing bureaucratic obstacles, non-tariff barriers, state aid and financial assistance from a national government to a domestic industry or company. The EU further promised to deepen integration between the EU which assisted Ireland as it attracted higher levels of foreign investments from countries such as Japan and the US. Ireland became more commercially aware as it was faced with the challenge of competing with the leaders of Europe. Many Irish exporters expanded abroad and the single market gave the guarantee and protection of common technological standards and protection through EU legislation. This new challenging opportunity brought about an increase in productivity and efficiency from Irish firms. Due to the safety net of the single market, Ireland was able to reduce its reliance on the UK and open itself up to a new trading scenario.¹

¹ Ireland and the EU, November 9, 2007,
http://ec.europa.eu/ireland/general_information/ireland_eu/index_en.htm

2.1.1 Ireland's economic progression

Ireland has had a problem in the past with persistent emigration, and since the emergence of the Celtic Tiger, emigration has slowed down and almost reversed with a huge amount of highly skilled natives returning to the island to take advantage of the thriving economy. Ireland can now boast one of the highest standards of living after Luxembourg in the EU and has achieved exceptional growth over the past few years.² Employment is one key area that has seen the most exceptional levels of growth relative to other EU countries. From the years between 1990 and 2005 employment levels went from 1.1 million to 1.9 million.³ The population increased almost 15% between 1996 and 2005 which throughout the past had seen successive decreases.⁴ The population of Ireland as of July 2007 figures was estimated to be 4,109,086.⁵ After the 1996 census it was revealed that 40% of the population was under the age of 25. This young workforce coupled with the concentration of people in urban areas has spurred the growth in the population over the last ten years.



Economic openness to global markets became key in shaping the policies and structures that still exist today. The core of these policies was to try to sustain low tax rates in order to attract investment. Open the country up to investment and make the island seem more attractive to investors. The thinking was to constantly develop and keep innovation at the forefront of thinking, and to build on what was already starting to take shape. The thinking was shared by the whole country who wanted a better future for themselves and their children without the previous trend of emigration. Government policies and decisions were driven by the public's willingness to succeed.

Industry predominantly consists of agricultural industries, forestry and fishing, high tech manufacturing, textiles, clothing and footwear, food, drink and tobacco, construction,

^{2,3,4} How Ireland became the Celtic Tiger by Sean Dorgan, June 23, 2006
<http://www.heritage.org/Research/WorldwideFreedom/bg1945.cfm>

⁵ Country Reports, Ireland, Stastics, November 13, 2007
<http://www.countryreports.org/country.aspx?countryid=118&countryName=Ireland>

financial services, tourism and retail.⁶ Government policy usually favors private enterprises. In areas where private investment was lacking the state established firms to operate these essential services in the hope that it would encourage industrial development. The areas this happened most notably was in the sugar, peat, electricity, steel, fertilizers, industrial alcohol, and transportation sectors. The annual growth rate of industry was in the region of about 5% from 1968-1981 and it reached 12% in 1984. The high tech sector such as the electronics and pharmaceuticals industry saw the most substantial growth, they also saw a huge increase in labor productivity so the increase in employment didn't follow the same trend. In 2000 industry employed 28% of the labor force and accounted for 36% of GDP in 2001 a 12.3% rise from the previous year. The dramatic increase in productivity at this time came mainly from foreign owned computer and pharmaceutical enterprises.⁷

2.1.2 Ireland's Industry

Industry predominantly consists of agricultural industries, forestry and fishing, high tech manufacturing, textiles, clothing and footwear, food, drink and tobacco, construction, financial services, tourism and retail.⁸

Agriculture is centered mainly on the export of beef and livestock which made up 50% of output value in 1998. In 1999 the EU agreed to reduce beef prices, this was followed by the BSE (Bovine Spongi-form Encephalopathy) crisis which hit the industry hard causing a 27% drop in beef consumption from the European market. This was followed in 2001 by an outbreak of foot and mouth disease in Britain. This brought about a heightened level of fear in consuming animal products and challenged the industry as the export markets in the EU reduced their intake of animal produce. Livestock products also suffered throughout this time with the most dramatic decline being seen in the dairy industry where output decreased from IEP1,132 to IEP1,113 million. Crop output also

⁶ Encyclopedia of the Nations, Europe, Ireland, by Catherine Lynch and Eoin O'Mally
<http://www.nationsencyclopedia.com/economies/Europe/Ireland.html>

⁷ Encyclopedia of the Nations, Europe, Ireland, by Catherine Lynch and Eoin O'Mally
<http://www.nationsencyclopedia.com/economies/Europe/Ireland.html>

⁸ Encyclopedia of the Nations, Europe, Ireland, by Catherine Lynch and Eoin O'Mally
<http://www.nationsencyclopedia.com/economies/Europe/Ireland.html>

saw a marginal decrease at the same time. The most important products during this period were milk, eggs and fresh vegetables with the highest commercial value coming from sugar beet, wheat and barley.

Forestry cover within the country is among the lowest levels in Europe at just 8%, against a 25% European average. Ireland has been working on reforestation programs since 1922 when only 1% of the country was under forested. Current EU policy encourages reforestation programs and timber based agriculture. Fishing on the other hand is an extremely important economic activity for the island especially in rural coastal areas where the concentration of industry is low. The fishing industry includes fish farming and employment in this area has increased 40% since 1980. The EU supports the industry by offering grants and government spending to encourage expansion, in 1997 exports were reported to reach IRE240 million.

High tech manufacturing consists of more than 1000 foreign-owned firms mainly concentrated in the areas of chemical production, metals, electrical engineering and computer hardware. Foreign owned manufacturing accounts for more than half the country's total manufacturing output. In 1998 foreign owned firms employed around 45% of the manufacturing sector's workforce or 28% of the total workforce. In the years between 1993 and 1997 engineering accounted for an increase in employment of 49% and an increase in output of metals and engineering of 96%. The chemical sector experienced similar levels of growth, while during the same time employment in the sector increased by 38% and output by 116%. Ireland's indigenous high-tech sector has also experienced impressive growth. The sector saw a growth in volume from 1987-1995 by 37%. Due to the links between the foreign owned firms and the indigenous market Ireland has emerged a world class competitor with world class management and manufacturing standards. There have been great movements made with the quality and reputation of local firms as many are now sought out by the foreign firms as their preferred source of supplies. This results in an impressive total expenditure of foreign companies in the Irish economy of IRE6.9 billion in 2000 which has risen from IRE2.9 billion in 1990. Foreign Investment has been encouraged by the government body, IDA (Industrial Development Authority). The IDA attracts foreign investment mainly in the

pharmaceutical and computer software industry's, the number of high tech industries they have encouraged has created a cluster that will further sustain the growth in these sectors. In the clothing, textiles and footwear industry's indigenous companies have usually been the majority players in this sector. There was no significant growth throughout the 1990s and as a result the industry has suffered due to cheaper foreign imports. The production of textiles remained stagnant during the 1990s while employment in this industry fell by 20%. From 1993 to 1997 the clothing and footwear industry saw their output fall by 20% and it has remained at a similar level ever since.

In the traditional indigenous manufacturing sector, food, drink and tobacco production recorded the strongest growth with a 6.1% increase in 1997. This sector not only concentrated on the home market but it also worked on the export markets too. The food industry mainly sees the largest revenues coming from beef, milk, eggs, fresh vegetables, barley, sugar-beets and wheat.

The construction industry benefited from the increased business investment, the infrastructure development and the housing shortage which saw construction output go from IEP13.7 billion in 1993 to IEP16.1 billion in 1996. The abundance of quarried stone in Ireland gives a ready supply to the construction industry.

There are four main clearing banks in Ireland – Bank of Ireland, Allied Irish Banks, Ulster Bank, and National Irish Banks. Employment in this sector has grown significantly increasing from 25,200 in 1994 to just under 30,000 in 1998 with banks now offering more financial services. In 1987 Ireland introduced an incentive to foreign financial institutions by setting corporation taxes at a low rate of 10%. This encouraged more than 300 banks mainly from North America and Europe to make a presence in the Irish Financial Services Center (IFSC) in Dublin, the IFSC employs somewhere in the region of 7,000 employees. These banks offer services such as investment banking, fund management, capital markets, leasing and re-insurance.

Ireland has long attracted tourists due to its small landmass, its culture, its beautiful scenery, beaches and friendly people. Tourism over the last few years has grown due to the government's overseas promotion programs and the easy access for Europeans as a popular weekend break destination. Revenue from tourism reached IRE2.8 billion in 1997, but dropped slightly in 1999 with figures of IRE2.5 billion. In 2000 at least

120,000 jobs were estimated to depend on tourism with the biggest threat coming from poor quality services, the shortage of skilled labor and transportation disruptions, terrorism hadn't begun to make its impact on this industry yet.

The retail industry was aided by the economic expansion which facilitated a more diverse retailing industry. Retail sales in 1997 reached a total value of 53% which, resulted in attracting large groups of retailers from the UK, this brought about competition which helped to control consumer price inflation.⁹

2.2 Background Information - Taiwan

Taiwan is a sub-tropical island, roughly 180 miles long, located less than 100 miles from China's Fujian province. Most of Taiwan's people live on the western coastal plain as most of the island is covered by rugged mountains. Taiwan has had a rich and varied history and if we go back to 1895 when the Japanese gained control of the country the economy was mainly agriculturally orientated with sugarcane being the most significant export. After the 1930s the government began encouraging investment in non-agricultural industry in Taiwan. The war that followed caused a lot of destruction and an economic collapse. In 1945 the Chinese Nationalist government took control of the country which resulted in hyperinflation as soldiers and refugees flooded onto the island and thus increased the population by about twenty percent. In the 1950s Taiwan depended on American aid, and the agricultural economy was in ruins after the events in the 1940s. In the late 1950s the economy experienced high speed growth and industrialization. This growth happened quite quickly and has been dubbed the "Taiwan Miracle" but the changes that have occurred have been completely based on the hard work and determination of the people of Taiwan. From the 1980s until the mid 1990s there were still dramatic changes occurring with drastic economic, social, and political changes taking place. In the 1980s the government announced plans for liberalization and globalization of the economy and the privatization of government-run enterprises. Interest rate controls were abolished and tariff rates were slashed, and the central

⁹ Country Overview, The Republic of Ireland, Catherine Lynch, Eoin O'Malley 10, November 2007

exchange rate was abandoned. To aid with the industrial development the government created the Hsinchu Science-based Industrial Park in 1981. In the years that followed a strategic scheme for industrial development was promoted and in the early 1990s the Statutes for the encouragement of investment were allowed to expire and the Statutes for industrial upgrading were adopted. The Taiwanese needed to compete on the world stage so they developed their labor-intensive industries to take advantage of the cheap labor costs and this caused many industries to upgrade their technical standards at a faster pace than maybe they originally foresaw. This acceleration of economic growth was also fueled by enticing many highly skilled overseas Chinese into returning to Taiwan by offering opportunities in the form of the Hsinchu Science-based Industrial Park. This saw their technological expertise being used to develop the electronics and information industries, and helped to change Taiwan's industrial structure.¹⁰

2.2.1 Taiwan's economic progression

This competitiveness and forward thinking is still very much apparent and Taiwan ranked 14th out of 131 countries in the 2007 Global Competitiveness Report.

Taiwan ranked fifth among Asian countries. Taiwan can put most of its success down to the strength that comes from education and innovation. Some of the areas of concern however were in the sophistication of its financial market and other institutions.

Taiwan has been doing business with the US and Europe for many years. Taiwan is establishing themselves as a major player in world business but this success has come relatively quickly and so some other areas need the time to catch up. Attitude change is progressing and Taiwan's economy is becoming more established with impressive progress being made in areas such as biotechnology, electronics and high-end production. The economy in Taiwan is mainly export oriented. In January 1995, Taiwan approved the Asia-Pacific Regional Operations Center (APROC), which is a project that would transform the island into a center of business and investment in the Asia-Pacific region. This is to promote the establishment of new local as well as foreign companies to

¹⁰ The Story of Taiwan-Economy, Composed by the Government Information Office in Taiwan, <http://www.taiwan.com.au/Polieco/History/ROC/report04.html>

Taiwan. Part of Taiwan's appeal is that it is well placed for investors to base here with access to China and other Southeast Asian markets. For local entrepreneurs the problem of experience can prove a hindrance for many looking to start their own venture.

To continue to endear itself to world trade Taiwan has had to modernize much of its infrastructure. In 2002 a six-year challenge was started to try to achieve a competitive edge with a package of reform and investment concentrating on economic growth and environmental protection. The main areas of focus were on government, banking and finance. Investment is directed toward four broad goals of nurturing human resources, encouraging research, development and innovation, improving international logistics and creating a high- quality living environment. The fact that Taiwan's financial institutions aren't as mature as others offers an entrepreneurial opportunity for many companies. The ability of some entrepreneurs to get funding has been an issue in the past as financial institutions have been a little underdeveloped.

Taiwan needs to achieve the status of a financial hub and in order to do this they need to continue making improvements to its domestic regulatory system so it can enhance the quality of their listed stocks.

Taiwan boasts a very healthy venture capital culture and many entrepreneurial success stories. There is strong institutional support for entrepreneurship within Taiwan and policy to support it.

2.2.2 Taiwan's Industry

In 2006, 36.6% of the workforce was employed in industry which included manufacturing, construction, electricity, gas, water supply, mining and quarrying contributing a total of 26.8% to Taiwan's GDP. In the same year 86% of industrial output was accounted for by manufacturing. The main industry is no longer consumer goods and textiles, electronics and information technology have now taken over and account for about 35% of total production value. In terms of production value, the

chemical industry accounts for 28.6%, information and communications technologies industries accounted for 34%, metal and machinery 36.9% and consumer goods 9.9%.¹¹

Taiwan is very prominent in the area of information technology, and can boast to be the largest suppliers of notebook PCs, motherboards, and LCD monitors. The figure for global IT hardware exports in 2006 totaled US\$88.6 billion. The products fall into eight major categories, notebook PCs, desktop PCs, motherboards, servers, digital still cameras, optical disk drives, color display tube monitors, and LCD monitors. The software industry totaled US\$5.34 billion in 2006 a 6% increase from the previous year. The software market can be divided into two main segments, software products and software services, the software products market increased by 10.7% and the services market increased by 5.5%. The semiconductor industry has been extremely successful for Taiwan. The industry has worked hard to distinguish itself from other countries by creating a complete supply chain with significant clustering, and top class capabilities in wafer manufacturing with an estimated production value of US\$37.15 billion in 2006. Another major industry for Taiwan is the optoelectronics industry, which includes areas such as optical information, optical displays, optical communications, and optoelectronic components. The output for 2006 was US\$42.6 billion, which saw a 46% growth from the previous year. Flat panel displays is another major market in Taiwan with value created in 2006 of US\$39.4 billion with almost 60% of the accounted for by exports. Communications equipment, mobile and network services have accounted for a huge contribution to the economy. Communications services reached up to US\$11.4 billion and the equipment production accounted for US\$21 billion. The value of Taiwan's textile industries has been on the decline with the output in 2006 being US\$11.76 billion this represented 5.3% of total manufacturing output. At the same time the petrochemical industry produced a value of US\$39.06 billion not including textile and plastic product businesses. The vehicle industry recorded a growth of 17.6% from 2005 to 2006, which accounts for a production value of about US\$14.5 billion. More than half of the motorcycles produced on the island were sold in the local market the rest were exported

¹¹ Major Industries in Taiwan, Composed by the Government Information Office in Taiwan, <http://www.taiwan.com.au/Polieco/Industry/Major/report01.html>

to the US, China and Japan. The bicycle industry has suffered a loss due to lower production costs in developing countries but still managed to export 4.7 million at an average unit price US\$192. The biotechnology and pharmaceuticals industries have made excellent progress and the firms are mostly focused in areas of genomics, pharmaceuticals, diagnostics, agricultural and environmental biotechnologies, biochips and bioinformatics. The total revenue in 2006 was around US\$5.5 billion. While biotech-related industries attracted investment of US\$646 million in 2006.¹²



¹² Major Industries in Taiwan, Composed by the Government Information Office in Taiwan, <http://www.taiwan.com.au/Polieco/Industry/Major/report01.html>

2.3 Definition of Innovation

The classic definitions of *innovation* include:

1. *the act of introducing something new: something newly introduced* (The American Heritage Dictionary).
2. *the introduction of something new.* (Merriam-Webster Online)
3. *a new idea, method or device.* (Merriam-Webster Online)
4. *the successful exploitation of new ideas* (Department of Trade and Industry, UK).
5. *change that creates a new dimension of performance* Peter Drucker (Hesselbein, 2002)

Innovation refers to something new usually in the area of economics, business or government policies. It must be substantially different to what already exists and not an insignificant change. Change must bring about some form of value with regards to economics. Be it customer value or producer value therefore innovations are intended to make someone better off and the increased amount of innovation within a nation will promote growth and development of that nation. Innovation may refer not only to radical change but also to incremental change of products, processes or services. Innovation more often than not stems from solving a problem therefore innovation is an important role in the study of business, economics, technology and engineering. Innovation is considered to be a major progression tool to any economy therefore the factors that lead to innovation are critical when governments are forming country policies.

Innovation can be linked to improvements in efficiency, productivity, quality, competitive positioning, market share etc. Every industry and organization is capable of innovation. While innovation can be seen as having a positive effect or adding value it can also cause problems in the form of changing old organizational forms and practices. This can result in destroying some organizations and others could encounter problems if the innovation is not carried out logically and strategically. Therefore innovation can be categorized as involving risk. Issues to consider when getting involved in innovation are trying to maintain a balance between process and product innovation. Process

innovations tend to involve a business model that may develop shareholder satisfaction through improved efficiencies whereas product innovations develop customer support but with it comes the risk of costly research and development that may affect shareholder returns.

It's believed that only people are capable of innovation and that systems and tools are there as a support for the process. Innovation is about something new, and all innovations develop from a new idea. Innovation must create value for its customers or for an organization. During the process of innovation it's important to stop long enough to gather new information about the process or situation. It's also critical to test the ideas and look at the possible outcomes from the innovation. Innovation therefore is how well a company or individual commercializes an invention. Bruce D. Merrifield's definition of innovation states that there are three stages in the innovation process "the three stages of innovation: invention, translation and commercialization."¹³



2.4 Definition of Entrepreneurship

Entrepreneurship and innovation are often concepts that overlap. Schumpeter (1934) defines entrepreneurs as individuals that carry out new combinations. He distinguishes four roles in the process of innovation, the inventor who invents a new idea; the entrepreneur who commercializes this new idea; the capitalist, who provides the financial resources to the entrepreneur; the manager, who takes care of the routing day-to-day corporate management. However the roles of entrepreneurs whatever they may be usually contain positive connotations.

A business entrepreneur is a person who operates a new enterprise or venture and assumes some accountability for the inherent risks (Casson M. 2005). Entrepreneurs are people that are not opposed to taking risks that are necessary to undertake a business venture. Often times the success is contributed to how well they utilize the factors of

¹³The definition of Innovation <http://innovationzen.com/blog/2006/11/17/the-definition-of-innovation/>

production available. Factors of production include land or natural resources, labor how well available resources can be utilized using human efforts, and capital including any type of equipment used in production.

Entrepreneurship is difficult and many new ventures fail, in order to find success a good entrepreneur is defined as the founder and involved in creating a for-profit enterprise. Usually the objective is for profit to be made and an entrepreneur's role is to create value by offering a service or product to obtain profit.

Definitions of entrepreneurship:

- Creation of new organizations (Garntner 1988)
- The carrying out of new combinations (Schumpeter 1934)
- The exploration of opportunities (Kirzner 1973)
- The bearing of uncertainty (Knight 1921)
- The bringing together of factors of production (Say 1803)



2.4.1 Other views of Entrepreneurship include:

- **Richard Cantillon** (circa 1730); Entrepreneurship is defined as self-employment of any sort. Entrepreneurs buy at certain prices in the present and sell at uncertain prices in the future. The entrepreneur is a bearer of uncertainty.
- **Jean Baptiste Say** (1816); The entrepreneur is the agent "who unites all means of production and who finds in the value of the products...the reestablishment of the entire capital he employs, and the value of the wages, the interest, and rent which he pays, as well as profits belonging to himself."
- **Frank Knight** (1921); Entrepreneurs attempt to predict and act upon change within markets. Knight emphasizes the entrepreneur's role in bearing the uncertainty of market dynamics. Entrepreneurs are required to perform such fundamental managerial functions as direction and control.

- **Joseph Schumpeter** (1934); The entrepreneur is the innovator who implements change within markets through the carrying out of new combinations. The carrying out of new combinations can take several forms; 1) the introduction of a new good or quality thereof, 2) the introduction of a new method of production, 3) the opening of a new market, 4) the conquest of a new source of supply of new materials or parts, 5) the carrying out of the new organization of any industry. Schumpeter equated entrepreneurship with the concept of innovation applied to a business context. As such, the entrepreneur moves the market away from equilibrium. Schumpeter's definition also emphasized the combination of resources. Yet, the managers of already established business are not entrepreneurs to Schumpeter.
- **Penrose** (1963); Entrepreneurial activity involves identifying opportunities within the economic system. Managerial capacities are different from entrepreneurial capacities
- **Harvey Leibenstein** (1968, 1979); the entrepreneur fills market deficiencies through input-completing activities. Entrepreneurship involves "activities necessary to create or carry on an enterprise where not all markets are well established or clearly defined and/or in which relevant parts of the production function are not completely known.
- **Israel Kirzner** (1979); The entrepreneur recognizes and acts upon market opportunities. The entrepreneur is essentially an arbitrageur. In contrast to Schumpeter's viewpoint, the entrepreneur moves the market toward equilibrium.
- **The Entrepreneurship Center at Miami University of Ohio**: "Entrepreneurship is the process of identifying, developing, and bringing a vision to life. The vision may be an innovative idea, an opportunity, or simply a better way to do something. The end result of this process is the creation of a new venture, formed under conditions of risk and considerable uncertainty."

Entrepreneurship can be viewed as the exploitation of opportunities that exist within a market. The exploitation of these opportunities can be most commonly associated with the combination of productive inputs. Entrepreneurs are usually seen as innovative or creative and are seen to be risk-takers, usually they must fulfill this perception in order to exploit the opportunities. Entrepreneurs are seen to be natural managers as they must manage the activities of an endeavor. An individual may act as an entrepreneur in

creating an organization but later may step into a more managerial role. So because of this small business owners would not be considered entrepreneurs. Therefore individuals within an organization may be considered entrepreneurs, even if they are not the founders, as an entrepreneur is classified as someone who pursues the exploitation of opportunities.

In the context of this paper to narrow down the discussion of entrepreneurship, I will use the working definition of entrepreneurship as ‘the introduction of new economic activity by an individual that leads to change in the marketplace (Sarasvathy 2000; Davidsson 2004).



2.5 Definition of Economy

1.
 - a. Careful, thrifty management of resources, such as money, materials, or labor.
 - b. An example or result of such management; a saving.
2.
 - a. The system or range of economic activity in a country, region, or community.
 - b. A specific type of economic system.
3. An orderly, functional arrangement of parts, an organized system.¹⁴

There is no set definition for a small economy; there are many ways to define it, the most popular measures are population, geographic size or GDP. Economy usually implies some form of region. A region does not have a precise meaning although it does imply some sort of space limitation of the area in question and maybe some characteristics that are common to that area. Boundaries of an economy can be dynamic or static, as regions can grow or contract and the structure of economic activity can change.

2.5.1 Taiwan and Ireland's Economy

Ireland's population as of July 2007 was 4,109,086. Taiwan's population at the same time was 22,858,872. Ireland's total geographic size is 70,280 sq km, comprising of 68,890 sq km of land and 1,390 sq km of water. Taiwan's total geographic size is 35,980 sq km, comprising of 32,260 sq km of land and 3,720 sq km of water.^{15, 16}

¹⁴ The Free Dictionary by Farlex, "economy", <http://www.thefreedictionary.com/economy>

¹⁵ CIA - The World Factbook, Ireland, <https://www.cia.gov/library/publications/the-world-factbook/print/ei.html>

¹⁶ Yahoo – World Factbook, Taiwan, <http://kids.yahoo.com/reference/world-factbook/country/tw--Taiwan>

GDP is defined as the total market value of all final goods and services produced within a country usually during a yearly period. The most common approach to measuring GDP is $GDP = consumption + gross\ investment + government\ spending + (exports - imports)$ ¹⁷

According to 2007 figures Ireland's GDP was \$253.3 billion.¹⁸ In the same year Taiwan's GDP was \$375.6 billion.¹⁹

Taiwan started off over fifty years ago as an underdeveloped, agricultural island, and has since emerged as a major economic power by transforming itself into a leader of high-technology goods. Taiwan's economy is capitalist in nature, with the government taking a step back in the guidance of foreign trade in recent years. Privatization is the trend with many state-owned banks and industrial firms moving towards this. The economy is mainly export orientated, with the majority of exports going to China and the US. Taiwan depends on an open world trade regime and any downturn in the world economy will leave it vulnerable. Taiwan is a member of the Asian Development Band, the WTO and the Asia-Pacific Economic Cooperation (APEC) forum, and it is an observer at the OECD. Taiwan's top three export partners are China, the US and Hong Kong with exports such as electrical, electronic and computer equipment. The main importers to the island are Japan, the US and China with imports such as mineral fuels, oils, electric and electronic components, and raw materials. China including Hong Kong accounts for 25% of Taiwan's total trade and 40% of total exports. Trade with the EU is less than 15% of the total.²⁰ China is Taiwan's number one destination for foreign direct investment after Japan.²¹ Taiwan has had a good year during 2007 where its GDP growth rate went above 5% and unemployment dropped below 4%.²² Agriculture contributes nearly 2% to the GDP of the island, with the main crops being rice, sugarcane, fruit and vegetables.

¹⁷ Central Stastics Office Ireland, Economy, IMF Summary Data Page for Ireland
<http://www.cso.ie/statistics/imfsummaryire.htm>

¹⁸ CIA – The World Factbook, Ireland, <https://www.cia.gov/library/publications/the-world-factbook/geos/ei.html#Econ>

¹⁹, ²¹, ²² CIA – The World Factbook, Taiwan, <https://www.cia.gov/library/publications/the-world-factbook/geos/tw.html>

²³, ²⁴ The Federation of International Trade Associations, Taiwan,
<http://www.fita.org/countries/taiwan.html>

Taiwan's natural resources are limited, but the manufacturing industry accounts for about 50% of total GDP. Taiwan still has very successful traditional industries such as iron, steel, chemical and mechanical which account for almost half the industrial production. Taiwan's success in recent years has come from being one of the largest suppliers of semi-conductors, computers and mobile phones in the world, they can also boast to being the largest supplier of computer monitors and LCD screens.

Ireland's economy is small, modern and very much trade-dependent, over the last twelve years the economy has seen growth averaging about 6%.²³ Industry and services are now the biggest industries where once it was agriculture. The modern economy is now based on sectors like IT, electronics, and pharmaceuticals. The export sector is extremely important to the economy and is mostly dominated by foreign multinationals. Recent growth in the economy was fueled by the boom which hit the construction industry, recent business investment and consumer spending. GDP is the second highest in the EU behind Luxembourg.²⁴ The government has tried to concentrate on putting an end to price and wage inflation. The beginning of 2008 has seen a slowdown in the property market, a slowdown in the construction industry, there has also been more intense global competition which leaves the forecast for 2008 a little lower than the success of recent years. The agricultural industry accounts for 3.5% of total GDP, with crops such as cereals, vegetables and the main area of bovine breeding.²⁵ Fishing is another important industry, with Ireland being the fourth largest salmon producer in Europe. Ireland exports 60% of its meat production. Ireland's service industry mainly the IT and electronics sectors accounts for 60% of total GDP and tourism contributes 5% to total GDP.²⁶

Ireland's top three export partners are the US, UK and Belgium with exports mainly comprising of organic chemicals, electronic and telecommunication equipment, and pharmaceutical products. Its main import partners are the UK, US and Germany,

²⁵ CIA – The World Factbook, Ireland, <https://www.cia.gov/library/publications/the-world-factbook/geos/ei.html#Econ>

²⁶ UK Trade and Investment, Countries, Europe-Western Europe-Ireland, <https://www.uktradeinvest.gov.uk/ukti/appmanager/ukti/countrie>

²⁷, ²⁸ The Federation of International Trade Associations, Ireland, <http://fita.org/countries/ireland.html>

comprising mainly of machinery, electronic components, vehicles, and mineral fuels and oils.²⁷

3 Literature Review

3.1 Michael Porter's Diamond

The diamond model of Michael Porter for the Competitive Advantage of Nations offers a model that helps to understand the competitive position of a nation in global competition. Economic theory usually mentions some factors for comparative advantage for regions or countries which include land, location, natural resources, labor and local population size. These factor endowments can't really be influenced, so they constitute a rather passive view towards national economic opportunities. Porter attributes sustained industrial growth to a concept of clusters or groups or interconnected firms, suppliers, related industries, and institutions that arise in particular locations and believes that an abundance of factor endowments actually undermines competitive advantage. Porter's competitive advantage of nations has been the outcome of four interlinked advanced factors and activities that occur with these companies and clusters. Porter also believes that these factors can be influenced in a pro-active way by government.

Porter's diamond framework consists of interlinked advanced factors for competitive advantage including:

- Factor Conditions
- Demand Conditions
- Related and Supporting Industries
- Firm Strategy, Structure and Rivalry

All influenced by government and chance events.

3.1.1 Factor Conditions

Factor conditions refers to inputs that are used as factors of production, such as labor, land, natural resources, capital and infrastructure. Porter argues however that key factors of production are created and not inherited. Specialized factors of production are capital, skilled labor and infrastructure. Specialized factors involve heavy, sustained investment which is difficult to duplicate and leads to a competitive advantage. Non key factors or more general factors which include unskilled labor and raw materials can be obtained by any company and therefore they do not constitute sustained competitive advantage. Porter believes a lack of resources can actually lead a society to become more competitive as an abundance generates waste and scarcity generates an innovative mindset.

Demand conditions according to Porter, argues that a sophisticated domestic market is an important element to producing competitiveness. Firms that are in a society with a sophisticated domestic market are likely to sell superior products because the market demands higher quality and the close proximity to such consumers enables the firm to better understand the needs and desires of the customers. If a nations discriminating values manages to spread to other countries then the local firms will become competitive in the global market.

Related and supporting industries are important to the competitiveness of firms, these include suppliers and related industries. This usually occurs at regional level as opposed to national level. Competitors that locate in the same area are known as clusters or agglomeration, there are advantages and disadvantages to locating in a cluster. Advantages include the potential technology knowledge spillovers, an association of a region on the part of consumers with a product and high quality and therefore some market power or an association of a region on the part of applicable labor force. Disadvantages include the potential poaching of your employees by rival companies and the increase in competition that may result in possibly decreasing profits or mark-ups.

Strategy compromises of capital markets and individuals career choices. Capital markets affect the strategy of firms as some countries have capital markets that work on the basis of a long-run outlook, while others have a short-run outlook. Industries vary in how long they consider the long-run to be. However countries with a short-run outlook tend to be more competitive in industries where investment is short-term whereas countries with a long-run outlook will tend to be more competitive in industries where investment is long term. Individual's career choices are based on their decisions regarding opportunities and prestige. A country will be competitive in an industry whose key personnel hold positions that are considered prestigious.

Structure is based on the best management styles among industries, some countries may be oriented toward a particular style of management and those countries will tend to be more competitive in industries where that style of management is suited.

Rivalry comes from the idea that intense competition encourages innovation. Competition is intense in regions where companies compete vigorously in most industries, while international competition is not as intense and motivating, international competition withholds enough differences between companies and their environments to provide excuses to managers who were outperformed by their competitors.

The government plays an important role in Porter's diamond model and Porter argues that there are some things that governments do that they shouldn't and other things that they do not do but should. Governments can influence all four of Porter's determinants through a variety of actions such as subsidies to firms either directly through money or indirectly through infrastructure, tax codes applicable to corporations, business or property ownership, educational policies that affect the skill level of workers, the development of specialized factor creation and enforcing tough standards. This creates a clarity about which industries they are choosing to help innovate and what methods they will use, and which industries that they are not helping.

The diamond system as a whole creates a system where all elements are self-reinforcing. Strong domestic competition leads to more sophisticated consumers who come to expect upgrading and innovation and can create specialized intermediate goods in an industry or

society. There is an element of chance in the model where random events can either benefit or harm a firm's competitive position, these can be anything like major technological breakthroughs or inventions, acts of war or destruction or dramatic shifts in exchange rates.



3.2 Defining International Entrepreneurship

International entrepreneurship is highlighted by changes in technological advances and cultural awareness and opens up foreign markets to new ventures. International entrepreneurship begins with an interest in new ventures and they seek to gain competitive advantage from the use of resources and the sale of outputs in multiple countries. Wright and Ricks (1994) defined international entrepreneurship as a newly emerging research arena, which included (a) comparisons of entrepreneurial behavior in multiple countries and cultures, as well as (b) organization behavior that extends across national borders and is entrepreneurial. This definition also excluded nonprofit and government organizations. International entrepreneurship is a combination of innovative, proactive, and risk seeking behavior that crosses national borders and is intended to create value in organizations.

Cross border entrepreneurial behavior focuses on how organizations, groups of individuals enact, evaluate, and exploit opportunities to create future goods and services. Based on the studies of Swedish manufacturing initial internationalization activities of many firms were targeted to psychically close markets and use less committed mode of entry such as exporting. Businesses increase their knowledge over time mainly through experience and then they can start to increase their foreign market commitments and later expand to more physically distant markets. Other views suggest that technological advances in transportation, communication and computers permit entrepreneurial actors to form new ventures that can internationalize quickly. International new ventures are said to own certain valuable assets, to use networks and alliances to control a large percentage of vital assets, this can help to provide a sustainable advantage that is transferable to a foreign location. Elements that affect the entrepreneurial venture are all open to perception, including environmental influences, industry conditions, and the mentality of the entrepreneurs. There is also an advantage seen to how quickly a firm can internationalize with earlier usually leading to an advantage. The influences on the speed of entrepreneurial internationalization is seen to have three aspects to it, the time between

the discovery or enactment of an opportunity and its first foreign market entry, secondly the speed with which country scope is increased i.e. how rapidly do entries into foreign markets accumulate and how rapidly are countries entered that are psychically distant from the entrepreneur's home country? And thirdly the speed of international commitment i.e. how quickly does the percentage of foreign revenue increase?

3.2.1 Entrepreneurial Internationalization

Entrepreneurial internationalization has four forces, (1) enabling, (2) motivating (3) mediating, and (4) moderating. First is the enabling force which makes accelerated internationalization feasible by utilizing faster and more efficient transportation, communication and digital technology among multiple foreign countries. Secondly motivation as a force of competition with many entrepreneurs taking preemptive action by utilizing technology opportunities in foreign countries before the competition takes advantage of it. Thirdly is the mediating force, which is enacted when the person or group that discovers or enacts an opportunity is central to the dynamics of international exploitation. Finally we have the moderating force which falls into two categories. The knowledge intensity of the opportunity combined with the know-how already available to the entrepreneur and the characteristics of the entrepreneur's international network mainly determines the internationalization speed.

Networking is a powerful tool for entrepreneurs and network analysis has been a powerful framework for international entrepreneurship researchers. Networks help entrepreneurs identify international opportunities, establish credibility and often lead to strategic alliances and other cooperative strategies. Once an entrepreneur discovers or enacts an opportunity and perceives the technologies that enable internationalization and the competitors that motivate it, the entrepreneur uses established network links that cross national borders to explore where and how quickly they can exploit an opportunity in a foreign location. So there are three key aspects to networks that help in the facilitation of the speed of internationalization, (1) the strength of the networks relationships, (2) the size of the network and (3) the overall density of the network. The relationships with customers, suppliers and others represent weak and strong ties. Strong ties are an

advantage but weak ties are more numerous. Larger entrepreneurial networks are usually associated with faster venture internationalization and more rapid increases in country scope. Therefore a large network in place will promote more venture capital from foreign sources and brings about commitment to internationalization. Finally the moderating aspect of entrepreneurial networks is density. Density brings about trust among networks. Successful international business operations are dependent upon reliable interaction among firms in multiple foreign countries, therefore dense cross-border networks provide relatively efficient support for internationalization.

Knowledge can also influence internationalization. Knowledge moderates the speed at which perceived opportunity is exploited internationally. A lack of foreign market knowledge can be an impediment to international expansion. Building on the behavioral view of the firm, the lack of foreign market knowledge can be seen as an impediment to international expansion as firms tended to confine their operations to the geographical area of their existing knowledge. The firm can be seen to progress to further stages of internationalization as they acquire more knowledge. International opportunity seeking can be seen as the key to international opportunity seeking. Results of a study show that the more knowledge-intensive a firm is, the more rapidly the firm grew in international sales, therefore the speed of commitment to internationalization increases.

International entrepreneurship has many possibilities and there are many opportunities for firms in this area.

3.3 Information and Technology Transfer

Ireland still invests heavily in education and research and the rate of constant innovation has been and will continue to be the driving force behind the success of the country. Ireland's economy consisted of an effective business climate, a stable economy, major foreign direct investment, EU aid and a progressive social partnership agreement. The government invested heavily in education and the result was employers found it easier to

find skilled workers helping them to expand their operations. Although over the last number of years the rate of growth has slowed down, the country still sees the importance of putting huge investment into education and research. Ireland is investing in a knowledge based future. There is no set innovation plan for the country; Ireland's innovation system is under constant review with the objective of continuing to attract foreign industry investment from abroad. Ireland does not have an entrepreneurial culture to compare with the US, but Ireland is still progressing and developing.

Education is extremely important to attract the foreign investment. So investment by the government in education became priority. The number of universities grew from 4 in the 1950's to 7 today with 13 institutes of technology. The high emigration that had prevailed in Ireland was somewhat due to the fact that graduates found it difficult to find jobs, now though many who had previously emigrated returned and the skills level of the country increased.

The plan became to continue attracting research expertise from abroad and nurture home grown innovative businesses. The large amount of multinationals was important but while Ireland was an important base for these companies some of them largely depended on their home countries for research, so the objective became to increase and embed new technology and innovation in companies in Ireland. The second part of the strategy was to develop indigenous industry, and make a move away from traditional companies to concentrate on innovation. Research found that indigenous companies were lacking in the area of innovation and that continued pressure from the export market will help focus their minds.

The National Development Plan 2000-2006, is encouraging current innovation activities. The plan was to invest 52 billion Euros in national infrastructure, 90% of this was to come from domestic sources which is a huge figure for a country with such a small population. Almost 2.5 billion Euros was reserved for research, technology and innovation developments. Funding for academic strategic research came from (SFI) Science Foundation Ireland focusing on ICT and biotechnology. These two areas were identified as the most relevant by a technology foresight exercise. The SFI's aim is to attract the best people internationally and they have put over 25 projects into operation to achieve this. The projects that they are funding are mainly proposed by universities and

staffed by international teams, as they aim to attract the best people internationally. The challenge comes then in translating research into products and services that can sell. The agency Enterprise Ireland manages a number of schemes to promote innovation in Irish business. One initiative is a research grant scheme called Innovation Partnerships which supports collaborative research and RTI (research, technology and innovation) which assist companies especially SMEs to invest in research projects. Another scheme R&D Capability assists companies to set up R&D infrastructure such as buildings and machinery. The R&D Awareness Initiative also offers seminars and consultancy support for firms about how to get started. Training courses on how to manage innovation are run by the Innovation Management Initiative and the Design Initiative promotes good design through a “design and brand” audit that can then be developed with the help of specialist consultants. Ireland’s Innovation Relay Centre is run by Enterprise Ireland and they help companies to source technologies and products from partners in Europe.

3.3.1 Risk Taking

Risk taking attitude hasn’t developed in Ireland at the same rate as innovation so to promote more risk taking and innovation policies and schemes have been implemented. As important as innovation is how can companies be encouraged to be more innovative. Research and Development is just one element of the innovation process, other important elements include leadership and innovation skills. So the question is how to get existing companies to act and think innovatively? So when analyzing innovation from a non technical perspective other areas need concern such as entrepreneurship, training, creativity, innovation management and long-term vision and financial management.

So the question remains if Ireland has created an entrepreneurial culture? Irish entrepreneurs are visible internationally so does this mean a culture of climate and awareness has been established?

The annual Global Entrepreneurship Monitor survey found that Ireland had the highest rate of entrepreneurial activity of all EU member states, with double the proportion of adults in entrepreneurial activity than others in the EU. One of the reasons for this is the attitude towards failure. Starting a business is risky and for every business that succeeds and grows countless fail. Failure in Ireland is frowned upon, and maybe an attitude

change is needed to encourage more risk taking as in the US. Due to this needed concentration on progression and innovation, the budget for research and innovation has to be constantly increased each year, with a 39% increase recorded in 2004. The national ability to innovate will determine the competitiveness, long-term success and economic growth for the future.

3.4 National Innovation Systems

Technology performance and policies have traditionally focused on inputs such as research and development expenditure and the number of people working in this area, and outputs such as the patents. However this narrow focus can have some limitations. Although these limitations are important sources of information their ability to measure the general innovativeness of an economy isn't as effective. Explanations of the trends in innovation, growth and productivity come from conventional indicators, which may not reflect the trends of the country. Innovation performance of a country depends on the linkages among the entities involved in improving innovation and how they relate to each other as elements of a collective system of knowledge creation and the technology used. These entities can include private enterprises, universities, public research institutes and the people within them. The linkages can come in the form of joint research, personal exchanges, cross patenting, purchasing of equipment etc. There is no single definition of a national system of innovation, what is important is the web of interaction between the different entities involved.

National innovation systems: definitions
A national system of innovation has been defined as follows:
<ul style="list-style-type: none">• “ .. <i>the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies.</i>” (Freeman, 1987)

• “ .. the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge ... and are either located within or rooted inside the borders of a nation state.” (Lundvall, 1992)

• “... a set of institutions whose interactions determine the innovative performance ... of national firms.” (Nelson, 1993)

• “ .. the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country.” (Patel and Pavitt, 1994)

• “.. that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artifacts which define new technologies.” (Metcalf, 1995)



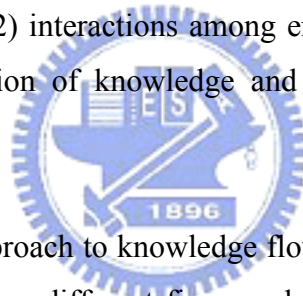
3.4.1 The national innovation systems approach

The national innovation systems approach reflects the rise of systemic approaches in measuring technology developments. Previously knowledge flows were measured very linearly with science being the main indicator and the increase in scientific inputs directly increasing the number of new innovations and technologies. Reality however shows that innovation can come from many different sources and at any stage of the research, development, marketing and diffusion process. Innovation can also take on many forms, including adaptations of products and incremental improvements to processes. Therefore innovation is the result of complex interaction between various entities and institutions. Technical change doesn't occur in a perfectly linear sequence, but through feedback and processing loops in the system. Sources for this feedback can come in the form of other firms, public and private research institutes, universities or transfer institutions, from

regional, national or international levels. So the innovative firm is seen as operating within a complex network of co-operating and competing firms and other institutions, continuing to develop their close linkages through joint ventures and ties with suppliers and customers.

Economic activities have become more knowledge-intensive and an increasing number of institutions with specialized expertise are involved in the diffusion of knowledge. What determines the success of enterprises and of national economies are their effectiveness of gathering and utilizing knowledge from these institutions, whether they are private sector, public sector or academia. Each country differs in their organization and governance regime for enterprises, their organization of their university sector and their government funded research.

The four basic knowledge flows among entities in a national innovation system are 1) the interaction among enterprises, 2) interactions among enterprises, universities and public research laboratories 3) diffusion of knowledge and technology to firms and 4) the movement of personnel.



When analyzing a country's approach to knowledge flows in national innovation systems and the close interaction between different firms and industries. The interactions may evolve around other elements such as the availability of key technology, shared knowledge or skills or producer supplier relationships. So regardless of a nation's overall level of innovativeness their performance usually stems from the clusters of industry and how they are connected. Clusters can be categorized as science based, scale intensive, supplier dominated or specialized suppliers. Each one has its own specific knowledge flow and their own method of accessing public research institutes and universities or other knowledge.

3.5 The definition and Measurement of Innovation

At firm level innovation is the process of introducing new ideas to the firm which result in an increased firm performance. Innovation differs from invention as invention may not be directly associated with commercialization. The basic definition of innovation is quite simple but there is no precise definition that can apply to all firms.

Joseph Schumpeter drew attention to the importance of innovation and he defined five types of innovation in the 1930's.

- Introduction of a new product or a qualitative change in an existing product.
- Process innovation new to an industry.
- The opening of a new market.
- Development of new sources of supply for raw materials or other inputs.
- Changes in industrial organization.



A technological product innovation can involve either a new or improved product whose characteristics differ slightly from previous products. The reason for these differences could be due to new technologies, knowledge or material. On the other hand a technological process innovation is the adoption of new or significantly improved production or delivery methods. When new or improved is referred to its not necessarily meaning a completely new approach, system or product, it refers to something new to the particular firm embarking on the innovation, regardless of who else is doing similar. So innovation can combine both the creation of entirely new knowledge as well as the diffusion of existing knowledge. The level of growth in an economy overall may be contributed in part to incremental improvements or innovations.

3.5.1 Measuring Innovation

Innovation is difficult to measure because of the broad scope and nature of its activities. In order to try to assess the results of innovation a distinction between the outputs of innovative activity and the inputs of innovation activity must be measured. The key

measurement of innovative activity is the success of the firm. So to measure the success of the firm it's essential to look at profits, revenue growth, share performance, market capitalization, productivity etc. Measuring these however may be difficult as these factors can be affected by other influences, making the true measurement of innovation difficult. Another approach is to create variables for the number of new or improved products introduced. Companies assess the percentage of their sales that can be attributed to new products, improved products and unchanged products. Firms that are highly innovative would be expected to have higher sales from new and improved products. The evaluation of improved processes is a little harder to measure so the result relies on the company's ability to estimate the percentage of product sales accounted for by new or improved processes.

Intellectual property statistics are also a measure of innovation. Intellectual property innovation can include patents, trade marks and designs. The existence of patents implies that the firm has a feeling that they have managed to create some new knowledge that they need to protect. Furthermore the fact that the firm has incurred a cost in the efforts to keep this knowledge protected means that they perceive it as having value. Therefore the very application for these patents can be seen as innovative behavior at the inventive stage of the process. The problem with this measurement however is the fact that this measure does not represent a commercially exploited innovation. So some researchers have concluded that patent and other intellectual property data are indicators of inputs to an innovation process rather than actual outputs.

Input measures of innovation have mainly relied on the level of research and development expenditure as the indicator for the level of innovative effort. It has its advantages as there is an actual dollar figure for the amount spent on R&D and therefore it makes it easier to analyze. Intellectual property can also be considered a measure of input into the innovation process.

Innovation can occur in the managerial methods and organizational structure of a firm. Marketing and training involves the entire resources of a firm in developing and

extracting value from new ideas. Marketing of ideas becomes key in realizing the value from the innovation.

The various output and input methods of analyzing the innovation of a firm are not conclusive by themselves. In many cases the units of measurements are not equal. One way to overcome this problem is to group some of the elements together to get a more comprehensive picture. Or alternatively relate the various innovation measures to the overall performance of the firm using econometric techniques. This can allow the value of the different innovation activities as well as an overall assessment of the activities involved in innovation. Some studies have measured patent data in place of R&D data or some have taken them together. But the problem with this measurement is that patents may have a limited value or they may never be commercially used. Another problem with patent data is that the proportion of commercial patents varies across firms and industries and also is liable to change over time.

Innovation in conclusion is changes to firm's activities over time that will improve firm performance. The changes can relate to new or improved products or processes, marketing spending, investment in new machinery or technology, training or intellectual property. The many layers of innovation makes a complete concise measure of innovation impossible. Companies will not only change how they measure innovation over time but also adapt new methods of innovation throughout its lifecycle. In saying this innovation is still considered to be a fundamental determinant of firm performance and no one measure can stand alone in its evaluation of the level of innovation.

3.6 The Global Entrepreneurship Monitor 2005 The Irish Report

The number of entrepreneurs starting and planning to start up new businesses increased from 7.7% in 2004 to 9.8% in 2005. This rise was the first for a number of years and showed that the decline over previous times had reversed. That is the equivalent of about 250,000 individual entrepreneurs, of which 137,000 were actively planning a new venture, while approx 112,000 were new firm entrepreneurs and had already established a new business venture in the 42 months prior to the survey (between the beginning of 2002 and summer 2005).

These statistics show that almost one in ten adults living in Ireland is actively planning or has recently set up a new business. One in seven men and one in twenty women are early stage entrepreneurs. One out of every two Irish adults perceives that there are good opportunities to establish a new business. One in every two Irish adults believes that they have the necessary skills to successfully run a new business. Over 2,600 individuals are involved in setting up new businesses every month. Over 3,800 new firm entrepreneurs who have set up approximately 2,600 new businesses already employ more than 20 people.

Ireland maintained its leading position in Europe regarding early stage entrepreneurial activity in 2005. Factors which are believed to affect the participation in entrepreneurial activity relate in many ways to the perception of opportunities within their environment, a belief in their own skills to be able to successfully start a new enterprise, their having recent entrepreneurs as role models within their personal network and a reduced reluctance to become involved in entrepreneurial activity through a fear of failure.

There has been a drop in the number of women involved in entrepreneurial activity and there now seems to be a greater involvement of men in the early stage of entrepreneurial activity. So a gender gap is opening up. Many of the new ventures are extremely small in nature and they expect to remain so. This is reflected in the fact that almost three out of every four new entrepreneurs expect to need about 10,000 euros to set up their new

ventures. The remaining 26% of entrepreneurs expect to need a much more substantial amount to set up their ventures, somewhere around 25 times more.

In 2005 there was an increase in entrepreneurial activity despite the fact that there was not an increase in the amount of informal investors. This is a problem as the amount of informal investors across the EU and OECD countries is estimated to be about 3.08% and this is of particular concern for Ireland as there is higher than average early stage entrepreneurial activity there and not investors to match.

3.6.1 Characteristics

Personal characteristics of Ireland's entrepreneurs; early stage entrepreneurial activity is dominated by men and this trend is even more pronounced among more established entrepreneurs. Early stage entrepreneurs are most likely to be found in the 25-34 age group range whereas more established entrepreneurs are most frequent among the 45-54 age group. The more educated of the country usually tend to be involved in early stage entrepreneurial activity than those that left the education system early. This however isn't true for older entrepreneurs, which suggests that the improvements that have been made in education of the younger generations have been paying off. The motivation is highly characterized by the fact that they perceive a commercial opportunity rather than believing that they have no other choices available to the.

Factors that affect people's motivation and involvement as an entrepreneur include such things as their individual perception of opportunities within their environment, a belief in their own skills to be able to successfully start a new enterprise, their having recent entrepreneurs as role models within their personal network and a reduced reluctance to become involved in entrepreneurial activities due to fear of failure. Entrepreneurs who have established themselves are also considered to be positive in nature and less daunted by the fear of failure.

It has been the trend that there are a greater number of men involved in entrepreneurial activity than women and in some more entrepreneurial countries the gender gap is less pronounced than in Ireland. The young age of early stage entrepreneurs has implications for countries with an aging population. However Ireland's population is relatively young as compared to other Western European countries and this is a factor in understanding the

reasons for Ireland's performance in early stage entrepreneurial activity. There is a fear of failure present among many Irish entrepreneurs and this often acts as a deterrent in pursuing these activities.

The type and quality of businesses that are being started are also important factors to acknowledge during this analysis.

The consumer services industries hold the most interest for new entrepreneurs. Almost one third of early stage entrepreneurs in Ireland are focused on the consumer services sector, which is less than other EU and OECD countries (43%). The principal focus in Ireland is on the transformative sector and within this on construction.

In the more established entrepreneurial businesses of three years or more, over 80% employ five people or less highlighting the fact that many Irish businesses start small and remain that way. Growth of such companies is very much the exception. Longer established companies employ more people as a general rule but this isn't because they have been around longer because time does not ensure more growth. Of longer established entrepreneurs only 6% are said to employ more than twenty people. In 2005 3.4% of new firm entrepreneurs employed more than 20 people.

There is a range of aspirations, entrepreneurs have for their businesses, almost one in four 24% expect to remain as sole traders with no one employed in the new business except themselves over the next five years. While 76% expect to generate sufficient turnover to justify having employees. There are only a small proportion of early stage entrepreneurs or those with businesses longer established that expect to employ more than twenty people in the next five years. Early stage entrepreneurs with high growth aspirations are rare. This trend is reflected in other countries not just Ireland. Only 9% of all early stage entrepreneurs across the EU and the OECD expect to employ twenty people or more.

Ireland due to its size and location makes it difficult to achieve growth without opening up to the export market. As with high growth entrepreneurs the number of entrepreneurs with significant export aspirations is relatively small. In 2005 more than half of the early

stage entrepreneurs expected to have more than half of their business from export markets.

GEM asks entrepreneurs who are proposing their ideas for new companies to assess the degree of novelty of the product/service to the customer, the intensity of the expected competition and the novelty of the technology or process involved. In Ireland entrepreneurs offering very innovative products or services are relatively rare, but early stage entrepreneurs usually offer more innovation than established entrepreneurs. Similarly many entrepreneurs expect to face many competitions in the market, there are very few who expect to face no existing competition for their product or service. It is more possible to see early stage entrepreneurs seeing themselves as first movers into the market than more established entrepreneurs. This may reflect a higher innovative potential of those who are just starting out with a new business idea or it may just show overly optimistic expectations of early stage entrepreneurs based on their limited market knowledge. Innovativeness of a business also depends on the technologies and production processes than they use. Usually new technologies and production processes are associated with a better utilization of resources, higher quality of routine tasks and higher productivity. Early stage entrepreneurs employ new technology to a much greater extent than established businesses do. It's the norm though that, entrepreneurs whether established or new apply technology and processes that match the innovativeness of their products.

3.6.2 Starting an entrepreneurial venture

Starting an entrepreneurial venture requires capital, Irish entrepreneurs generally use a combined method of financing through personal funding, informal investors comprised of family, friends and strangers, and other methods such as formal business angels, venture capitalists, development agencies, grants or debt financing. In 2005, the average amount that early stage entrepreneurs estimated they needed to start a new business venture in Ireland was just over 23,000Euro. On average they were anticipating finding 50% of that figure from their own resources. This further highlights the point that the majority of new businesses, are very small and expect to remain so. This is reflected in the fact that

almost three out of every four new entrepreneurs expect to need on average to need about 10,000Euro to set up their new business. The financing requirements of the remaining group of entrepreneurs are much more substantial which, is about 25 times that amount 250,000Euro.

There is a divide in the personal contribution by those whose new businesses are less capital intensive than those that require more initial funding. The group that require more funding have proportionately less of their own money to invest in the new venture and their requirement for outside funding is accordingly much greater. Regardless of the level of their own investment almost all of them expect to make a profit on their investment, whereas only 50% of the informal investors expect to make a profit.

Informal investment is extremely important as a source of finance for new businesses. In 2005 informal investment was greater than classic venture capital as the main source of capital for start-up companies. In the US the world leader in venture capital, business angels fund 100 times as many high-tech, seed-stage companies as venture capital firms do. The majority of informal investors consist of family and friends. In Ireland early stage entrepreneurs say that only 2% of their informal investors would be strangers. This is reflected in the fact that 30% of informal investors do not expect to get their money back and only half expect to make a profit on their investment. The average rate of informal investors across the EU and OECD countries is 3.08% of the adult population. This may be of concern for Ireland as the early stage entrepreneurial activity in Ireland is higher than the average across these countries, yet the funds available from informal investors is less.

The activity that informal investors engage is 44% this indicates that they are investing in new businesses in the transformative sector, which includes construction and manufacturing and just 8% have invested in business services. This shows that entrepreneurs in business services tend to be less asset based and so attract fewer informal investors than entrepreneurs in more traditional, asset based sectors and in turn early stage financing difficulties may be greater.

It is rare for early stage companies to seek or secure venture capital funding. In Ireland very high growth is only expected from companies that are high-tech, R&D intensive, and export oriented. VC investment may not necessarily be the most suitable for early

stage companies as VC's need an exit strategy for its investment in a relatively short timeframe. VC backed companies continue to rely on the mergers and acquisitions market as an exit mechanism with VC firms often finding themselves in the position of having to support their portfolio companies longer than they might have originally intended.

In 2004 GEM detected an increase in the number of women entrepreneurs that are actively planning new businesses. In 2005 although no real growth took place but the improvement noted in the previous year had been sustained. There were about 70,000 women involved in early stage entrepreneurship in 2005. That is the equivalent of 5.5% of the adult population of women aged 18-64 in the country. Early stage entrepreneurial activity comprises of those in the advanced stages of planning the set up of a new business, and those who have recently set up a new business. The increase mainly consists of women new firm entrepreneurs, which is a positive development so in 2005 34,250 women had recently set up a new business in Ireland. There is generally a greater involvement of men in early stage entrepreneurial activity in Ireland usually 2.6 times as many women. In 2005 there were 180,000 men involved in early stage entrepreneurial activity. This is usually 14.2% of the adult male population aged 16-64.

There are 12.3% of adult male and 3.9% of adult women that have set up their own companies and have been running them for many years. However the gender gap between men and women at that stage is even more pronounced than it is between those that have recently started as entrepreneurs. This is due to the heightened perception of opportunities within their environment, a belief in their own skills and having recent entrepreneurs as role models within their personal network and a reduced reluctance to become involved in entrepreneurial activity through fear of failure. These characteristics are not evenly distributed among men and women in the adult population, but in all instances these characteristics are less prevalent among adult women than men. This can maybe explain the lower level of women's involvement in early stage entrepreneurial activity. The area of childcare support has a negative impact on the involvement of women in entrepreneurial activity. In every country it is evident that women are less involved in entrepreneurial activity than men. The average early stage entrepreneurship

rate across 25 selected countries is 8.9% of adult men compared to 4.6% of adult women. The participation rate of women relative to men is even 56%, and among established entrepreneurs the participation rate of women relative to men is even less than 51%. Irish women are relatively less involved in entrepreneurship than are women on average across the 25 selected countries. The level of entrepreneurial activity among Irish men is at a similar level, which is at a similar level as most OECD countries, apart from New Zealand which is far ahead of the group. Increasing the number of women involved in entrepreneurial activity in Ireland would bring the level into line with the most entrepreneurial of the OECD countries.

The environment for early stage entrepreneurship is concerned with individuals and their individual decisions to set up new businesses. Those decisions are influenced by both the personal context, political, economic and social environment where they live and work. The strength of the economy in recent years has provided many opportunities for new enterprises. Demographic factors such as the increase in population, increased inward migration and relative youth of the population have played a part in the entrepreneurial activity. Irish culture and social norms play their part, in Ireland these are positively in favor of entrepreneurs and their new ventures. This means that Ireland has strong opinions regarding entrepreneurship with most believing that entrepreneurs are held in high regard, entrepreneurship is a good career choice, and the media plays a positive role. One interviewee summed up the situation at the moment as:

I think culturally, self-employment is now viewed in a much more positive and respectful fashion than 10-15 years ago. The State also provides a broader range of financial, fiscal and soft supports than ten years ago. Indeed, people almost started a business in the 1980's "in spite of" the environment. This is in stark contrast to the situation today.

Improvements need to be made with regard to the level of informal investment. Finding sufficient start up capital would have been difficult for entrepreneurs as informal investors are low as compared to international standards.

Other problems include accessibility to available finance in terms of weaknesses in the Irish entrepreneurial environment. Difficulties exist for entrepreneurs in raising sufficient finance to meet their financial requirements, which is also a problem for other countries and not only Ireland. Many entrepreneurs are not particularly positive about the prevailing conditions within their countries. Issues around government policy, in particular the burden of compliance costs and local authority charges on new companies in terms of weaknesses in the Irish entrepreneurial environment were seen as a problem. From locations outside of Dublin and the mid east problems identified were deficiencies in the telecommunications infrastructure, the additional time and cost involved in traveling to meet customers and the difficulties in finding a suitably skilled and experienced pool of labor. Although there is an abundance of graduates available from third level education, small entrepreneurial knowledge based businesses requires personnel with more experience as the company cannot afford the time to bring graduates up to the experience level that they require.



3.7 Ranking National Innovative Capacity

Internationally competitiveness is becoming more reliant on innovation. There is continued operational improvement in education and infrastructure. Local companies are able to acquire and deploy technology from around the world. Producing standard products using standard methods no longer sustains competitiveness. Where high income countries are concerned the intensity of innovation is closely related to the differences in prosperity. In developing countries low cost inputs by themselves are not sufficient to maintain competitiveness. Companies need to have access to and develop global technology. Enhanced prosperity comes from the ability of companies in a nation to create and globally commercialize products and processes, shifting the innovation frontier as fast as rivals can catch up. Innovation need not be dependant on what other countries are doing. Innovation can bring about improvements in productivity, improve consumer value, and increase prosperity thus improving the rate of world economic growth. Innovation can also address social challenges such as near-term economic growth and health, safety and the environmental impact of development.

Within countries innovation is usually dominated by geographically concentrated clusters of firms, supported by local institutions and domestic competition. The number of countries capable of global innovation is on the rise but there are still many differences between them. Scandinavian countries and Japan have had sharp increases in innovative output, while many western European nations, such as France and Italy are not as innovative. Emerging economies such as Singapore, Taiwan and Israel outpace leading OECD economies. Eastern European and Latin American countries still depend on low labor costs and imitation of foreign technology.

The intensity of innovation varies across countries. This study reveals how innovative output is affected by measures of the national environment. Some countries record a decline in innovative capacity as sometimes they have an inability to improve local conditions as quickly as other nations.

3.7.1 The Determinants of National Innovative Capacity

Innovation location is shaped by the national innovative capacity. National innovative capacity is a country's potential as a political and economic entity to produce a stream of commercially relevant innovations. National innovative capacity focuses on the realized level of innovation, as well as the environment for innovation in a particular location. It can depend on the sophistication of past technology and the size of the scientific and technical workforce while reflecting a series of investments and policy choices by government and the private sector. This highlights the importance of local circumstances in R&D productivity. Companies based in the same location can differ in their innovation success.

A nation's common innovative infrastructure consists of a set of factors that cross and support innovation throughout an entire economy. The foundation of an economy's level of sophistication depends on the scientists and engineers that are involved in innovation. Common innovation infrastructure includes investments in research institutions, which advances understanding and commercial technology. Government funding is the main factor in real frontier research. Important areas for policy makers include the protection of intellectual property, the extent of tax-based incentives for innovation, and the degree to which antitrust enforcement motivates and encourages innovation. The extent to which innovation is encouraged versus the rate its impeded by the structure of safety, quality and environmental regulations and the openness of the economy to trade and investment.

The development of commercialization of new technologies takes place disproportionately in clusters. The cluster specific innovation environment is captured in the diamond framework. (See Appendix 2)

The presence of specialized and high-quality inputs, a local context in that field encouraging investment and spurred by intense rivalry, pressure and insight from sophisticated local demand for that clusters products and services, and the local presence of high quality related and supported industries.

When operating in a cluster a company can rapidly assemble the personnel, components, machinery and services necessary for commercialization. Reinforcing these relationships for advantages is pressure for most companies. Innovation of a cluster is fundamental to the competitiveness of that cluster.

Linkages and the quality of them are also extremely important. The quality of the connections between a nation's common innovation infrastructure and the individual clusters is important to innovation. If there aren't strong linkages then scientific and technological advances can be exploited by other countries quickly. Some of the most important linkages include the universities of a country, which can bridge researchers and companies. Formal and informal organizations including trade associations, standards agencies and technology networks can be utilized to build connections between research centers and firms.

Innovative capacity needs to be taken advantage of by companies. Regardless of the innovative environment, many companies may be ineffective. Companies must embrace strategies based on innovation, and support policies in R&D spending, customer orientation, recruiting and training. Competitive advantage may not only come from the allocation of resources but also from local innovation and the environment that the company is in. So the prosperity of firms comes from their ability to innovate at a global level.

To measure national innovative capacity it's important to look at different sources of data. Sometimes government sources are inadequate because they fail to capture the drivers of innovative capacity in a consistent way across a wide range of countries.

International patenting is a measurable instrument to analyze innovative output as well as surveying companies within a particular economy.

There are three measures relating to the cluster innovation environment of a nation, these include the sophistication of domestic customers, the extent of locally based competition and the extent of product and process collaboration. These factors has an impact on the rate of international patenting, even if other factors affecting nations are considered

including population, the historical propensity to innovate, and the size of the R&D workforce.

The strength of linkages between common innovation infrastructure and a country's clusters and firms are also useful. This is a difficult area to measure as it reflects the subtle collaboration between public and private institutions and firm investments. This measure is based on the local availability of specialized research and training institutions and the availability of venture capital for innovative but risky projects. The number of training institutions specialized in research and the number of leading universities that foster links is important here. Countries differ in their ability to foster collaboration between the public and private sectors. Most developing countries rank lowest in this area due to the weak research institutions and a history of unrest among governments, business and universities. Developing linkages requires attention from government on policies, resource investments, institution building, and attitude shifts that require patience and perseverance.

The extent to which companies strategies and operating practices are oriented toward innovation versus other modes of competing. The national environment shapes the opportunities and restrictions that companies face when they are setting their own strategies. If they choose strategies based on innovation capacity of their local environment they can take advantage of the impact of corporate practices on innovative capacity. This includes the degree to which competitive advantage depends on introducing unique goods and services, the extent and sophistication of marketing and the degree to which pay is linked to productivity. Innovation oriented strategies result from managers' choice to seek competitive advantage from sustained introduction of unique products and services rather than low cost inputs.

Overall innovative capacity is calculated by analyzing;

- Science and engineering manpower index
- The innovation policy index
- The cluster innovation environment subindex

- The innovation linkages subindex
- The company operations and strategy subindex.

Innovative capacity and competitiveness are correlated even among countries with low incomes. The challenge however is how can developing countries access and exploit technology from elsewhere. So the development of innovative capacity has to do with how well they can absorb technology and their ability to create technology.

In summary innovation has become an extremely important source of competitiveness in advanced economies. A country's overall competitiveness relies on their capacity to innovate and their prosperity level.



3.8 The Competitive Advantage of Taiwan

Discussion topics included the recent economic downturn, the unemployment levels and the uncertainty of the future relationship with China.

Challenges facing Taiwan include addressing chronic weaknesses, making the transition from an investment-driven to an innovation-driven economy, and defining the economic relationship with China.

The rising prosperity includes a nation's standard of living which is determined by the productivity with which it uses its human, capital, and natural resources. The definition of competitiveness is prosperity. Productivity not only depends on the value of products and services but also the efficiency that they are produced. What industries a nation's companies compete in are not the issue, the issue is how the firms compete in those industries. The productivity of a nation is reflected by what domestic and foreign firms choose to do in the areas they choose to locate. The productivity of local industries and their competitiveness are extremely important to the levels of competitiveness of traded industries. Devaluation does not make a country more competitive it just reveals a lack of fundamental competitiveness therefore many nations compete in offering the most productive environment for business. Public and private sectors play different but interrelated roles in creating a productive economy.

Innovation and prosperity is built on competitiveness and productivity, and the capacity for innovation. Advanced economies usually have their innovation supported by high levels of prosperity.

Development of productivity and productivity growth is determined on macroeconomic, political and legal context factors. Macroeconomic foundations of development are linked to the sophistication of the company and its operations and strategy with the quality of the microeconomic business environment.

It's important to have sound macroeconomic policies and a stable political and legal system to promote a prosperous economy. Competitiveness can and almost always depends on improving the microeconomic foundations of competition.

The microeconomic business environment is closely related to productivity.

There are many conditions that affect the context for firm strategy and rivalry. If there is a local context it encourages efficiency, investment and that upgrading is continued. Competition among local based rivals is healthy as it allows the presence of capable and locally based suppliers and firms in related firms. This also promotes clusters instead of isolated industries. A firm relies on factor conditions or inputs that are of high quality and specialized. These include human resources, capital resources, physical infrastructure, administrative infrastructure, information infrastructure, scientific and technological infrastructure and natural resources. The demand conditions of a firm include having sophisticated and demanding local customers, having unusual local demand in specialized segments that can be served globally and having customer needs that anticipate needs elsewhere.

There are stages of economic development, these include resource driven economy, investment driven economy and innovation driven economy.

3.8.1 Resource driven economy

Competitive advantage can be gained from basic factor conditions such as low labor, natural resources and geographic situation or location.

Technology is usually gained through imports, FDI and imitation. There is sometimes a lack of direct access to customers and many companies compete on price. Companies can have a limited role to play on the value chain and mainly focus on the assembly of labor intensive manufacturing and resource extraction. This type of economy is very sensitive to world economic cycles, commodity prices and exchange rates.

3.8.2 Investment driven economy

Producing standard products and services efficiently may be a competitive advantage. Technology is accessed through licensing, FDI, joint ventures and imitation. The nation usually has the capacity to not only assimilate foreign technology but also has the capacity to improve on it. The economy supports heavy investment in efficient infrastructure and modern production processes. Companies are capable and do serve

original equipment manufacturing customers and are able to extend their capabilities more widely in the value chain. The economy can be more focused on outsourcing and service exports.

3.8.3 Innovation driven economy

The dominant source of competitive advantage is based on the innovation of products and services at the global technology frontier. The economy is characterized by strengths in all areas together with the presence of deep clusters. Companies often have unique strategies with a global scope. The economy has a high service share and is resilient to shocks in the economy.

3.8.4 Taiwan's current position

Taiwan's primary focus is on manufacturing. It competes strongly on price and efficiency. Taiwan has a strong strategy of serving OEM customers. There is a high rate of investment in modern production methods and assimilating technology. Strong capabilities to improve and enhance foreign technology have been the trend for many years. Taiwan has shown to have export led growth. The government has had a substantial role in steering and molding the economy. There is an emergence in innovative capacity as Taiwan is in an investment driven period.

3.8.5 Limits of the current strategy

Labor costs are now high as compared to relative neighboring countries in a similar stage of development. Other domestic costs are also rising and it means Taiwan is facing an increasing pressure in the export markets. As a result, Taiwanese companies are investing heavily in lower wage locations around Asia so as to maintain current strategies. The proximity of China offers an easily available alternative location with access to a huge domestic market. The exports from Taiwan are heavily dependent on a single cluster in which other Asian countries are also involved and compete. The downturn in IT investment from the US has a large impact on Taiwan.

Some of the weaknesses that need to be addresses are improvements in the physical infrastructure, the upgrading of domestic financial markets, the increase of transparency, openness and legal accountability, and boosting the efficiency of domestic industries.

There are many sources of competitive advantage that can be gained from performances. Operational effectiveness such as assimilating attaining and extending best practice or Strategic positioning which involves a unique and sustainable competitive position are some of the strategies being taken. Company strategies that are typical in Taiwan include concentrating on manufacturing more that service. Rapidly adapting new technologies when they become available, and competing on price and time to market aspects also. Servicing OEM customers in the US and other Asian countries while focusing R&D on cost and process improvements. Others include searching for low cost inputs while investing modestly in human capital. Many companies in Taiwan face the challenge of making the transition from competing on cost to competing on unique products and services.

Environment regulation and competitiveness is an important area to focus. Competing in the past has been based on weak environmental standards, which perpetuates low incomes for the citizens. Corporate pollution is a sign of inefficient and unproductive use of resources. Firms need to combat inefficient extraction of resources, incomplete material utilization, unnecessary waste products, unnecessary energy use, and unproductive use of land. The customer needs to be aware of usable materials that are part of discarded products, products that use energy inefficiently, and discarded or unnecessary packaging. The need to treat pollution and control to a certain extent these problems causes companies to perform activities that are costly but create no value to the customer. So pollution is a reflection of the company and their sophistication of technology and their weak management. Strict environmental regulation stimulates the upgrading that is necessary to achieve advanced economic development.

Taiwan has some established clusters such as electronics, plastics, textiles and apparel. The government should play an appropriate role in economic development of Taiwan. Firstly they need to establish a stable and predictable macroeconomic, political and legal

environment. Improve the availability, quality and efficiency of general purpose infrastructure and institutions. Set up rules and incentives that govern the competition and encourage productivity growth. Facilitating cluster development and upgrading is very important. Creating an explicit, ongoing process of economic change and competitive upgrading informs citizens and mobilizes the private sector, it mobilizes the government at all levels the education institutions and civil society.

The government in Taiwan has come up with some strategies to combat low employment levels the job creation strategy included subsidies to create new jobs and FDI subsidies. Competitive strategy includes creating the conditions for productivity and cluster development. This involves improving the efficiency of infrastructure, cluster based training and improving the flexibility of labor markets.

Industrial policy and cluster policies offer different advantages and problems. Industrial policy targets desirable industries and sectors while focusing on domestic companies. It intervenes in competition and centralizes decisions at the national level this can lead to distorted competition. Cluster based policy focuses on all clusters and believes the clusters can contribute to prosperity. Domestic and foreign companies both enhance productivity in this policy. Impediments and constraints are relaxed and cross country linkages and their complementarities are emphasized. Encourage initiative at the state and local level which will all add up to enhanced competition.

The relationship with China is important there is a common language, a strong historical ties and personal ties through family relationships and migration, and there is a substantial economic presence of Taiwanese companies in China. Taiwan's goal should be to create a mutually beneficial relationship that supports Taiwan's higher standard of living. Taiwan needs to define a unique role with China so that they can build on its distinctive strengths and offset China's weaknesses and rigidities. For mutually beneficial roles between the two, Taiwan needs to gain a unique position and build on the specialization in areas where they can give China access to its competitive advantages. Areas for this may include the clusters in Taiwan, which may provide a more conducive environment than China. There are parts of the value chain where Taiwan has developed unique advantages that China will have difficulty replicating. For example in the area of

R&D and design Taiwan should offer a better R&D infrastructure and a more conducive environment for innovation than China. Taiwan can play this role combined with manufacturing activities located on the mainland and provide a competitive advantage to the region. Taiwan has some sophisticated services and can develop its professional services for China's export industries. There are some complementary fields of specialization that can be utilized by Taiwan such as its management education and its capabilities to educate the business leaders of the region. Taiwan can build on its science and technology base to become the center of science education in the region. Media and entertainment can also play a role in this because Taiwan is more liberal with regards to its media and it has the potential to become the media, entertainment or publishing hub for the region.

So in conclusion a successful transition to the innovation driven stage makes a mutually beneficial relationship with China more likely, the proximity to China increases the pressure on Taiwan to move from the investment driven to the innovation driven stage.



3.9 Key Findings of Literature Review

Systems and tools exist to support the process of innovation. Innovation is about something new and all innovations develop from a new idea. Innovation must in some way be able to create value for its customers or the organization. It's important to constantly evaluate the innovation throughout the development stage so that new information can be assessed and existing work evaluated.

An entrepreneur is a person who operates a new enterprise of venture and assumes some accountability for the inherent risks. Entrepreneurs need to be people that are not opposed to taking the risk in order to undertake a business venture. Entrepreneurial success can be attributed to how well factors of production are utilized and the opportunities that are available or that exist within an economy.

Ireland invests heavily in education and research and the rate of constant innovation has been and will continue to be the driving force behind the success of the country. Over the last few years Ireland's economy consisted of an effective business climate and stable economy. There has been major investment from foreign investors and a substantial amount of EU aid as well as a progressive social partnership agreement. The government has been a driving force in the progression that has been made in the economy, with heavy investment in education which has helped employers expand their operations by having a steady stream of capable employees. Even though the growth of the economy has slowed some what over the last couple of years the government still realizes the importance of putting huge investment into education and research and investing in a knowledge-based future. The government has realized that education is a key factor in attracting foreign investment so this is why they have made it such a high priority. Increasing the number of universities and third level institutes became key because although companies were choosing to invest in Ireland they weren't relying on Ireland for their research so this was essential to try to break this trend and embed some technology and innovation into companies here. Another focus to improve and develop indigenous industry and encourage companies to concentrate on innovation was identified.

Innovation is important but it isn't so easy to encourage companies to be more innovative. Risk taking attitude hasn't developed in Ireland at the same rate as innovation so some risk-taking and innovation policies have been developed and implemented to try to encourage more innovation. Some of the elements of the innovation process that have been given a lot of attention include a focus on research and development, leadership and actual innovation skills. Another element of improving innovation requires existing company to improve their innovation. The focus when trying to improve innovation is to concentrate on areas such as entrepreneurship, training, financial management, creativity, innovation management and long-term vision. The question remains, has Ireland managed to create an entrepreneurial culture? There are Irish entrepreneurs visible internationally but does this indicate that a successful climate has been established? The answer to this lies in an individual's analysis of innovation.

Performance at an innovative level relies on many factors, some inputs include research and development expenditure and the number of people working in this area and outputs such as patents filed.

Starting a business is risky and many new ventures that are started fail. In Ireland however there isn't a favorable attitude to failure and this can have a negative impact on people willing to take their innovations to the entrepreneurial level, more risk-taking needs to be encouraged.

3.9.1 Measuring Innovativeness

Measuring the innovativeness at a national level is difficult as there are limitations to the sources of information. The most important thing however is the web of interaction between different entities involved. Innovative performance of a country depends on the linkages among the entities involved in improving innovation and how they relate to each other as elements of a collective system of knowledge creation and the technology used. The linkages can come in the form of joint research, personal exchanges, cross patenting, purchasing of equipments etc. Innovation can also be present at any stage of the research, development, marketing and diffusion process. It can take many forms including adaptations of products incremental improvements or processes. Therefore innovation is the result of complex interactions between various entities and institutions. Technical change occurs through a series of feedback and processing loops in the system, examples of these include the availability of key technology, shared knowledge or skills or producer supplier relationships. Innovation doesn't necessarily mean a new invention, an incremental improvement to an existing product also classifies itself as innovation. Process innovation to a new industry or the exposure of a company to a new market constitutes innovation. Even a change in the supply chain for raw materials or the discovery of new sources of supplies or changes to the industrial organization of a company can mean innovativeness.

The overall level of growth in an economy may be contributed in part to incremental improvements or innovations. Another method of measuring innovations is by looking at the intellectual property statistics that an economy produces. Intellectual property includes patents, trade marks and designs. The existence of patents implies that the firm has a feeling that they have managed to create some new knowledge that they need to protect. The firm will perceive the intellectual property to have a real value as they will incur a cost in an effort to keep the knowledge protected. To get a clear understanding of the level of innovativeness, it isn't enough to just analyze the various output and input methods by themselves because in many cases these outputs and inputs aren't equal. One way to overcome this problem is to group the elements together to get a more comprehensive picture. Or alternatively relate the various innovation measures to the overall performance of the firm using econometric techniques. Companies will not only change how they perceive and measure innovation over time but also adapt new methods of innovation throughout its lifecycle. So in conclusion innovation is changes to a firm's activities over time that will improve the overall performance of the firm.

3.9.2 Entrepreneurship in Ireland

Entrepreneurship in Ireland is quite high and those who are not actively participating in entrepreneurial activity are thinking about it in some way or know someone who is. According to research almost one in ten adults living in Ireland is actively planning or has recently set up a new business. One in seven men and one in twenty women are early stage entrepreneurs. Entrepreneurship is looked favorably upon by many Irish people and one out of every two Irish adults perceives that there are good opportunities to establish a new business. One in every two Irish adults believes that they have the necessary skills to successfully run a new business. Over 2,600 individuals are involved in setting up new businesses every month. Over 3,800 new firm entrepreneurs who have set up approximately 2,600 new businesses already employ more than 20 people.

Informal investment plays a huge part in entrepreneurship but despite the fact that there wasn't an increase in informal investors in 2005 there was an increase in entrepreneurial activity.

Ireland's entrepreneurial activity is dominated by men and this is more obvious when established entrepreneurs are analyzed. People's motivation and involvement as an entrepreneur can be affected by the perception of opportunities within their environment, a belief in their own skills to be able to successfully start a new enterprise, having recent entrepreneurs as role models within their personal network and a reduced reluctance to become involved in entrepreneurial activities due to fear of failure. Demographic factors such as the increase in population, increased inward migration and relative youth of the population have played a part in the entrepreneurial activity. Irish culture and social norms play a part in the encouragement of entrepreneurship, in Ireland these are positively in favor of entrepreneurs and their new ventures. This translates into Ireland having strong opinions regarding entrepreneurship with most believing that entrepreneurs are held in high regard, entrepreneurship is a good career choice, and the media plays a positive role. In Ireland the most popular industry for early stage entrepreneurs is in the consumer services industry. Almost one third of early stage entrepreneurs in Ireland are focused on the consumer services sector.




3.9.3 Competitiveness

Competitiveness internationally is relying more and more on innovation and entrepreneurship. Producing standard products using standard methods no longer sustains competitiveness. In high-income countries the intensity of innovation is closely related to the differences in prosperity. In developing countries low cost inputs by themselves are not sufficient to maintain competitiveness. Companies need to have access to and develop global technology. Prosperity and enhanced prosperity comes from the ability of companies in a nation to create and globally commercialize products and processes, shifting the innovation frontier as fast as rivals can catch up. Innovation doesn't necessarily rely on what other countries are doing. The rate of world economic growth can be improved by the improvements in productivity and improvements in consumer value. Innovation can also address social challenges such as near-term economic growth and health, safety and the environmental impact of development.

Innovation intensity varies across countries and is affected by the national environment. Some countries are forced to record a decline in innovative capacity as sometime they have an inability to improve local conditions as quickly as other nations.

The foundation of an economy's level of sophistication depends on the scientists and engineers that are involved in innovation. Government funding is one of the main factors in real frontier research. Policy makers have important areas to consider, such as the protection of intellectual property, the extent of tax-based incentives for innovation, the degree to which antitrust enforcement motivates and encourages innovation. The quality of the connections between a nation's common innovation infrastructure and the individual clusters are important to innovation. If there aren't strong linkages then scientific and technological advances can be exploited by other countries very quickly. Some of the more important linkages include the universities of a country, universities can be responsible for bridging the gap between researchers and companies. So overall the competitiveness relies on their capacity to innovate and their prosperity level.



Competition is very important to improve innovativeness, as there are many conditions that affect the context for firm strategy and rivalry. A local context encourages efficiency, investment and the constant upgrading of equipment, machinery and inputs. Competition among local based rivals is healthy as it allows the presence of capable and local based suppliers and operations in related firms. This can also be responsible for clusters instead of isolated industries. Clusters are important as they can improve the overall efficiency of a firm and make them more successful. A firm relies on factor conditions or inputs that are of high quality and specialized. These include human resources, capital resources, physical infrastructure, administrative infrastructure, information infrastructure, scientific and technological infrastructure and natural resources. The demand conditions of a firm include having sophisticated and demanding local customers, having unusual local demand in specialized segments that can be served globally and having customer needs that anticipate needs elsewhere. Competitive advantage can be gained from basic factor conditions such as low labor, natural resources and geographic situation or location. Gaining technology is important and this is usually done through imports, FDI and imitation. There is sometimes a lack of direct access to

customers and many companies compete on price. Companies can have a limited role to play on the value chain and mainly focus on the assembly of labor-intensive manufacturing and resource extraction.

An investment driven economy concentrates on producing standard products and services efficiently which may create a competitive advantage. Technology is assessed through licensing, FDI, joint ventures and imitation. The nation usually has the capacity to not only assimilate foreign technology but also has the capacity to improve on it. This economy typically supports heavy investment in efficient infrastructure and modern production processes. Companies are capable and many serve OEM customers and are therefore more capable of extending their capabilities in the value chain more. The economy can be more focused on outstanding and service exports.

On the other hand an innovation driven economy is the dominant source of competitive advantage and is based on the innovation of products and services at the global technology frontier. The economy is characterized by strengths in all areas as well as the presence of deep clusters. Companies often have unique strategies with a more global scope. The economy has a high service share and is resilient to shocks in the economy.

3.9.4 Taiwan's focus

At the moment Taiwan's primary focus is on manufacturing and as the country competes very strongly on price and efficiency. Taiwan has a strong strategy of serving OEM customers and there is a high rate of investment in modern production methods and assimilating technology. Strong capabilities to improve and enhance foreign technology have been the trend for many years. Taiwan has had mainly export led growth and the government has had a substantial role in steering and molding the economy. Taiwan is in an investment driven period of growth and there is an emergence in innovative capacity. Taiwan's domestic costs are rising as the economy gains momentum and as a result Taiwan is facing an increasing pressure in the export markets. In order to maintain the current strategies Taiwan is forced to explore other lower cost/wage locations. Taiwan can use its geographical position and proximity to China as an alternative location with the added benefit of access to the huge domestic market. In Taiwan some of the

weaknesses that need to be addressed include improvements in the physical infrastructure, the upgrading of domestic financial markets, the increase in transparency, openness and legal accountability, and improving efficiency of domestic industries.

So in conclusion a successful transition to the innovation driven stage makes a mutually beneficial relationship with China more likely, and the proximity of the island to China increases the pressure on Taiwan to move from an investment driven economy into a more innovation driven stage of development.



4 Study Findings

4.1 Factor Conditions

Porter (1990) Key factors of production are created not inherited. Factors such as unskilled labor and raw materials doesn't constitute much advantage for an economy but if those factors become more specialized such as skilled labor, infrastructure, sustained investment this becomes more difficult to duplicate and leads to a competitive advantage. There are two classifications of factors basic and advanced, generalized and specialized. Basic factors include natural resources, climate and un/semi skilled labor which Porter classifies as passively inherited, whereas advanced factors consist of those that require substantial investment in human and physical capital in order to develop them. The difference between generalized and specialized factors is based on their ability to perform tasks. There are generalized factors available in most nations, they can be sourced from global markets and their activities can be performed from a distance. Specialized factors however are developed with considerable investment from the generalized factors. Therefore sustainable competitive advantage exists when a nation possesses the factors necessary to compete in a particular industry, which is advanced and specialized.

Ireland's generalized factors are the most predominantly used. Despite the fact that Ireland manages to produce high-tech products these tasks may not constitute highly skilled labor, the reason for this may be because many Multinational Companies (MNCs) will keep all the advanced specialized factor activities in their home countries, therefore technology, marketing, innovation and industrial expertise are imported into Ireland from the parent country. The investment in continuous upgrading of factors takes place outside Ireland and therefore there is little incentive for these companies to do this kind of investment in Ireland. This leaves Ireland competing in the high tech industry and receiving the benefits but not being able to generate new knowledge and skills to generate sustainable advantage from them. SMEs on the other hand who start a company entrepreneurially will add to the economy as they will keep all the specialized factors in their home economy.

The indigenous companies in Ireland have grown due to their strategy of depending on the basic-generalized factors. This approach doesn't necessarily encourage government to provide more advanced specialized factors, therefore the trend has seen companies in Ireland having low levels of innovation and reinvestment which results in them sticking at a successful activity even if it's a narrow single activity. In saying this however Ireland are realizing their situation and are making strides in trying to overcome this and move into a more innovative stage.

The Taiwan focus however is more on specialized factors, Taiwan has good infrastructure and a readily available specialized labor force. Universities have been focused on the importance of engineering, technology and the computer industry and encouraged development in these areas which has helped to build up a reputation for being a technically advanced nation. Taiwan's government has encouraged the progression of the specialized factors by developing special science based industrial parks to house these companies, encourage multinationals to locate there while using their innovations to develop their own skills and increase their knowledge. There has been considerable outside investment in the economy encouraged by tax benefits and a skilled labor force. Taiwan also realizes the need to continue innovating and have set up government programs and incentives to carry on making progress into the innovation stage.

4.1.1 Growing a Knowledge Economy

Both countries have made progress but what is the current economic situation and what are the future plans to encourage economic growth and entrepreneurial innovation?

Ireland's plan for the next five years is to become internationally renowned for the excellence of its research and try to become the forerunner in using new knowledge for economic and social progress within an innovation driven culture. To do this it is important that Ireland focuses on education, research groupings and partnerships that will facilitate this progress and drive growth of the economy in a global society.

There is a National Development Plan 2007-2013 that is in place to promote scientific research with the government committing 8.2 billion Euros for the duration.²⁸ The main aim of this strategy is to build research excellence and human capital while encouraging academic and industry collaboration. The project will encourage collaboration between academic groups and industry partners and give grants and costs to different groups depending on the extent and type of research and the size of the company. The aim is to link outstanding research scientists and engineers across the areas of academia and industry. The focus will be on some crucial research questions so as to foster the development of new and existing technology companies. It will provide time and resources to attract and cultivate strong campus-industry partnerships that can inform and enhance research programs.

Taiwan's plan for the next few years is to continue to limit Taiwan's economic reliance on China while trying to attempt to benefit from the mainland's strong economic performance. There will be a watchful eye on the tax policies as companies may choose to move to lower cost locations. Taiwan is just coming to the end of a national development plan that was put in place almost six years ago at a cost of \$75 billion. The plan which began in 2002 set out to achieve specified goals, including expanding the number of products and technologies that meet the world's highest standards, doubling the number of foreign visitors, increasing expenditures on research and development to 3% GDP, reducing unemployment to less than 4%, increasing the average growth rate to over 5%, increasing the number of broadband internet users to over 6 million, and creating about 700,000 jobs.²⁹ Other elements of importance that were included in the plan were things like improving the level of English, cultivating talent for the E-generation, developing the cultural arts industry, developing a digital Taiwan, using information technologies to make the government more efficient and industries more competitive. Taiwan aimed to make itself a regional headquarters for multinational corporations and to construct culturally rich hometown communities in the hope that it

²⁸ OECD, Science Foundation Ireland, Danish Enterprise and Construction Authority Business Symposium, Open Innovation in Global Networks 25/26 February 2008 – Copenhagen
<http://www.oecd.org/dataoecd/51/19/40206142.pdf>

²⁹ Encyclopedia of the Nations, Asia and Oceania, Taiwan, Taiwan Economic Development,
<http://www.nationsencyclopedia.com/Asia-and-Oceania/Taiwan-ECONOMIC-DEVELOPMENT.html>

will help retain talent. There is a huge focus on value added improvements as well as improving the transportation infrastructure, conserving water and doubling the number of tourists. In 2008 the last part of the development plan is to promote industrial policy with an innovation oriented approach, creating R&D centers in Taiwan by foreign corporations, the setting up in Taiwan of local innovation and incubation centers for SMEs.³⁰ Throughout the plan and the plan for the future the focus is to lead the country into a more high value-added approach through innovation, invention and R&D.

4.1.2 Creating Value through Innovation

Taiwan and Ireland have created a significant amount of intellectual property over the last few years and exploited it to their advantage. Taiwan has evolved into a knowledge economy and moved away from traditional industries to concentrate on ideas, images and knowledge. To become successful in creating a knowledge economy it requires creative thinking, data processing and transmission of knowledge to achieve success in business. The knowledge-based economy has many prevalent business segments such as information and communication technologies, intellectual property such as patents, brand-names, advertising and financial services, applications and accumulation databases and virtual recreational services.³¹

A knowledge economy creates a demand in intellectual property protection, because it is sometimes difficult to keep trade secrets, therefore when an economy is making progress in this area the need for an increase in intellectual property protection becomes clear.

Patents are a form of statutory protection for technical innovations. Patents allow the holder for a limited period, the right to exclude others from exploiting the patented invention without permission. Patents are a form of industrial property and can be assigned, transferred, licensed or used by the owner. Patents are territorial and therefore

³⁰ SMEA, Ministry of Economic Affairs, Taiwan's Economic Development, 2006/10/31
<http://www.moeasmea.gov.tw/ct.asp?xItem=72&CtNode=263&mp=2>

³¹ ATIPS, Strategies and Tactics in Intellectual Property Management for the Knowledge Economy Era, Leo H. Lin, PhD, President; Asia Pacific Technology and Intellectual Property Services, Inc.
<http://www.atips.com/english/news/2004.05.11.htm>

are only valid in the country or countries specified. The most common time span for a patent is short term ten years and standard term twenty years.³²

In Taiwan in 2006 there were 80,988 new filings for patents with 49,315 certificates actually issued, of the new filings 50,111 were applications for new inventions and 7,958 were for new designs.³³ In the same year in Ireland there were 935 patents filed directly in Ireland with 357 being granted, however there were 123,912 European applications specifying Ireland with 33,895 actually granted. The largest number of patents filed in Ireland in 2006 fell into the physics category with 189 patents being filed.³⁴

In 1996 Taiwan recognized the importance of innovation and entrepreneurial activity in the new economy and took the lead in fostering and developing incubation centers. There was three core strategies devised by the Ministry of Economic Affairs and the Industrial Technology Investment Corporation (ITIC), these strategies would form the SME incubation platform with their focus on incubation centers, entrepreneurial knowledge and information, and financing support for the start-ups.³⁵ ITIC established Taiwan's first incubation center for ITRI in 1996. The ITRI center has incubated over 80 startups, attracted over 2,300 people to work in the center and created around \$400MM in capital investments.³⁶ The incubation center has been extremely successful and so far 16 companies that started in the incubation center have been approved to enter the Hsinchu Science Park, which is a significant achievement considering the guidelines of entering such a district. The incubation center not only offers a platform for startups but also ensures that there is funding to keep abreast and monitor the latest trends in the high technology industry investments. In total around Taiwan there are 66 incubation and

³² Irish Patents Office, What is a Patent? <http://www.patentsoffice.ie/en/patents.aspx>

³³ Taiwan Intellectual Property Office, Annual Statistics 2006, http://www.tipo.gov.tw/eng/statistics/Annual_Report_2006.pdf

³⁴ Irish Patents Office, Seventy Ninth Annual Report of the Controller of Patents, Designs and Trade Marks, 2006, <http://www.patentsoffice.ie/PDF%20Documents/Annual%20Report%202006.pdf>

³⁵ Small and Medium Enterprise Administration, Ministry of Economic Affairs, Taiwan, Enhancing the function of incubation service, <http://www.moeasmea.gov.tw/ct.asp?xItem=3397&ctNode=469&mp=2>

³⁶ Industrial Technology Investment Corporation, Award-winning Incubation Center, <http://www.itic.com.tw/HTMLENGLISHSITE/incubationcenter.htm>

innovation centers with a large percentage having an affiliation to a University or an institute of technology.³⁷

4.1.3 What makes an Entrepreneur?

When building a knowledge economy it is important to encourage and promote entrepreneurship, as according to Porter's view it is the small SMEs that make a difference in an economy, so what makes an entrepreneur an entrepreneur and can this be manipulated and encouraged?

There is no doubt that there are differences in terms of personality traits between entrepreneurs and non-entrepreneurs. Gartner (1988) had an argument regarding the personality traits of entrepreneurs he concluded that the question should be changed from 'who is an entrepreneur?' to 'what the entrepreneur does?' Gartner argues that the behavior of entrepreneurs is more relevant to the creation of organizations than psychological traits.

Entrepreneurs usually display strong ambitions and have different motivations. Jeffery Timmons and his colleagues from the Massachusetts Institute of Technology identified 14 important entrepreneurial characteristics of successful enterprise owners.

- Drive and energy
- Self-confidence
- High initiative and personal responsibility
- Internal locus of control
- Tolerance of ambiguity
- Low fear of failure
- Moderate risk taking
- Long-term involvement
- Money as a measure not merely an end
- Use of feedback

³⁷ Agriculture Biotechnology, Maker Database, Incubation Center, http://agbio.coa.gov.tw/maker_en.aspx?sno=59&item=7

- Continuous pragmatic problem solving
- Use of resources
- Self-imposed standards
- Clear goal setting

Although few entrepreneurs would possess all traits and many may display strengths in some areas and weaknesses in other. Some views of entrepreneurship would consider success as the money and profit where others might accept a reduced profit for an increase in status or breakthroughs in innovation. Other characteristics of an entrepreneur include the tolerance of ambiguity and a low fear of failure. Tolerance of ambiguity refers to the ability to accept unexpected or contradictory evidence of something while keeping an open mind. Having a high fear of failure can lead to a goal-dominated behavior but this can actually have a destructive effect as the fear can sometimes be so strong that it causes the individual to bring about the failure that is feared. Having a low fear of failure means the entrepreneur is prepared to risk things going wrong and setbacks are handled better without the entrepreneur being deterred. Having a high achievement mentality will encourage motivation but a low fear of failure may be useful in times when there is business chaos and uncertainty.

This is well and good but the true test of an entrepreneur comes when they face individual problems in certain situations. Although a person might display certain traits the actual stage of a venture, the experience level of the entrepreneur and the scale of the problem they face will have a big effect on their decision analysis and whether they display more caution or more confidence. Being a part of a team may also help the entrepreneur to be a little less cautious as groups not only provide support but offer a wider range of skills and a group can often come up with more thorough decisions. Another element identified to contribute to the level and quality of success an entrepreneur reaches is that many have a high internal locus of control. This refers to the fact that their behavior determines what happens to them and that they can control their own behavior. This indicates that the entrepreneur is more personally independent giving them added motivation.

Entrepreneurs to some extent display high levels of self-confidence, energy, flexibility and opportunism and are generally individuals who are accustomed to getting involved and getting positive results from their involvement. They are prepared to expend energy and mental effort because they expect and receive valuable rewards. Entrepreneurs are flexible and opportunistic because they believe they have capacity to become involved across a broad range of situations. Expending energy and working hard adds to the entrepreneur's self-belief and motivation, which can almost always facilitate benefits. On the other hand entrepreneurs with an internal locus of control are more affected by the decisions of people in more powerful positions than themselves, which can include strong partners, customers and suppliers. This can create problems and people can believe that chance or luck determines events rather than taking control of the situation.³⁸



³⁸ The Open University, BBC, Management and Organizations, What makes an entrepreneur?
http://www.open2.net/moneyandmanagement/management_organisation/entrepreneur.html

4.2 Demand Conditions

Porter (1990), the more demanding the customers in an economy, the greater the need for companies in that economy to become more innovative while improving their competitiveness and quality. Therefore demand is at the root of national advantage. So innovation and improvements will occur when pressure is placed on producers by buyers to innovate. When domestic buyer's needs become more sophisticated, this provides a window to the more advanced needs of other buyers which finally create economies of scale.

Within Ireland however the domestic buying market is small therefore creating economies of scale benefits becomes more difficult as aggressive investment holds little incentive. Therefore it is safe to assume that Irish firms are unlikely to develop products with only the domestic market in mind more realistically firms will develop products with not only Ireland but also the UK and other parts of Europe in consideration also. Irish people also have a tendency to not complain about the quality of products, which can lead to decreased pressure on producers to improve products or quality as the feedback is limited.

The Taiwanese domestic market is small but component manufacturers are still very competitive with each other to vie for big overseas contracts. Taiwan has the added advantage however of its close proximity to China, which gives them the market potential of 1.2 billion Chinese customers as well as other parts of Asia. Taiwanese customers are sophisticated and are very vocal about the quality of their products, they tend to make it known if they feel the product is substandard or not good value for money.

4.2.1 How Society Influences demand and Creates Entrepreneurs

Culture and education can foster a spirit of enterprise and strengthen the motivation and capacity of entrepreneurs and potential entrepreneurs. Society not only influences the demand in a society by the level of their involvement but on the other side of the coin they also determine the level of entrepreneurship and innovation that the society partakes in. The environment in which one lives reflects the likelihood of entrepreneurial activity taking place. Entrepreneurs are more likely to emerge if the culture is supportive and encouraging of entrepreneurs and supported by a strong economy with buoyant consumer demand.

Taiwan has developed its entrepreneurial culture from an attitude of hard work and self improvement. Simple entrepreneurship in Taiwan dates back many generations with many people starting their own business, this is where we get the name “Laoban” which directly translated means entrepreneur-owner. Most of Taiwan’s original entrepreneurs were independent and relied on personal networks and relationships for business purposes. These personal networks with a social focus suited the “guanxi” or relationship orientated business approach. Taiwan’s economy is mainly export orientated and these small networks still play a role today as a lot of entrepreneurial activity is still done using this process. Many Taiwanese still have the mentality that nothing beats being your own boss as being your own boss is something to be proud of in Chinese societies, which still stimulates many of the smaller ventures that are operating today. Taiwan has one of the highest concentrations of companies in the world with about 1.2 million registered companies according to Taiwan’s ministry of Economic Affairs. Taiwan’s entrepreneurial culture is very vibrant with many of the more traditional entrepreneurial ventures including illegal roadside stalls. These makeshift stalls can be a good training ground for young budding entrepreneurs or a way to hone their entrepreneurial skills. Mr. Ryan Wu vice-president of 1111 Job Bank, has identified two groups that are the most likely to start their own ventures, the first is young people below 28 years old and the second is people above 40 who are looking to make a mid-career switch.

There is a healthy spirit of risk-taking and optimism, which are crucial elements of entrepreneurship and with the increased investment in education many are becoming more highly educated entrepreneurs.

In Taiwan the general manager is registered as the responsible person and they are then personally and criminally liable for the actions of the company. This is different from most western societies. The general manager can then be responsible if the company is engaged in fraud and in extreme cases be jailed. The environment in Taiwan however is conducive to operating a company and the costs are generally low as compared to other countries with the regulations being quite clear. To start a company the minimum investment required for a company limited by shares is NT\$1 million, and for a limited company it is NT\$500,000. Tax issues are also reasonably clear with companies having to pay 25% tax on the profit made every year and a 5% sales tax every two months.³⁹

Ireland's culture towards entrepreneurship has improved in the last few years as can be seen with the increased abilities and confidence in the entrepreneurs. More people have become aware of other successful entrepreneurs, which in turn has brought about interest in entrepreneurship as a career choice.

Irish society has become more diversified over the past few years with a significant amount of inward migration and nationals returning. There are five main regions of origin for non-Irish nationals living in Ireland including; UK, EU Countries, Asia, African, non-EU European countries and the US.⁴⁰ This influx has been a major contributor to the broadening of cultural diversity in Ireland and in some ways has spurred entrepreneurial spirit.

Ireland might not be quite as entrepreneurial as Taiwan, in Ireland the culture is a little more conservative, with 39% of adults displaying a 'high fear of failure' towards starting their own business. Starting a new business represents a good career choice according to

³⁹ Taipei Times, Take the Plunge: How to become an entrepreneur, Aug 15, 2005, Page 11, <http://www.taipetimes.com/News/biz/archives/2005/08/15/2003267856>

⁴⁰ National Consultative Committee on Racism and Interculturalism (NCCRI), Barriers facing ethnic minority entrepreneurs in Ireland, Submission to the EMERGE Equal Project, <http://www.nccri.ie/submissions/05JunEmerge.pdf>

66% of adults, while 85% of adults consider that there is a high degree of status associated with successful entrepreneurship.⁴¹ Within Ireland there is a positive supportive attitude towards entrepreneurship with an increasing number of role models as more government policies and successful entrepreneurs emerge. The fact that the economy is quite strong is also a factor in encouraging a positive attitude towards starting a business. The media and a growing population allows society to positively strive towards entrepreneurship. However some of the areas of concerns include a lack of access to early stage finance, the small domestic market, the rising costs and their impact on competitiveness, and regulatory issues.

One of the main differences between Ireland and Taiwan is that entrepreneurship in Ireland is less need based than Taiwan. Many of Taiwan's small SMEs emerge from sheer necessity or from a gap in the market where as in Ireland entrepreneurship is a little less loose. Ireland is less innovative than Taiwan and business ideas are mostly based on existing technology and existing local markets.



⁴¹ Entrepreneurship in Ireland in 2004, An Overview,
www.intertradeireland.com/module.cfm/opt/29/area/Publications/page/Publications/down/yes/id/304

4.3 Related Supported Industries

Porter (1990), believes that being within a reasonable proximity of upstream or downstream industries facilitates the exchange of information and promotes a continuous exchange of ideas and innovations.

“Different firms in the same industry performing different value chain activities create a demand that stimulates innovation. This occurs because buying firms are demanding in terms of quality and technological standards. Exchange relationships help in identifying new needs and allows for a tight collaboration in the process of developing new products and production processes; therefore stimulating competitive abilities in emerging industries.” (Porter 1990).

Clusters are used as a vehicle for economic development as they can encourage behavior that can improve the competitiveness of firms and local economies.

According to Porter’s observation a cluster is defined as;

“Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region. Clusters arise because they increase the productivity with which companies can compete nationally and globally.” (Porter 1990).

Clusters are important as they allow companies to be more productive and innovative than they would potentially be in isolation. Clusters can also reduce the barriers to entry for new business creation relative to other locations. For a cluster to occur there needs to be some basic characteristics. The first is proximity, there needs to be a sufficiently close space so that a sharing of common resources can occur. The second is appropriate linkage; the activity needs to share a common goal, like the final market demand so that there is profit from the proximity and interaction. The third element is interaction; it isn’t enough to be close there needs to be active interaction for the benefits to be realized. The last element is critical mass, there needs to be a sufficient number of participants present during the interactions to have a meaningful impact on the companies’ performance.

Many policy makers understand the importance of entrepreneurship and that it genuinely is the key to sustaining an economies growth. Encouraging entrepreneurship is different from encouraging other development. Entrepreneurship can bring benefits to an economy as a whole as it brings with it the formation of new companies, a new way of doing things or the invention of new products. Clusters are extremely important as they create a cycle, successful firms attract suppliers and service providers and in turn can spin off into other successful startups with a university usually within close proximity. The government has an important role to play in the encouragement and development of entrepreneurship and entrepreneurial clusters.

There are many effects to the state of various local and state policies while trying to create entrepreneurially driven growth. To create entrepreneurial clusters there are many policies that need to be addressed. There is no standard policy or model of another country that can be copied to achieve success, each industry has a varied history and all are at different stages of their development. Entrepreneurship starts locally by individuals and if successful expands the enterprises to other locations. Having strong research facilities and universities are extremely important in stimulating local growth but not essential to form an entrepreneurial cluster. However, strong universities can stimulate growth through educating and transferring ideas that can then become commercialized by local entrepreneurs. Areas hoping to form such entrepreneurial clusters should do so with the attitude that if it is built people will come. Having strong local educational systems and institutions, and developing supporting infrastructure are important for existing companies regardless of whether they stimulate the growth or formation of new companies. Although the likelihood of them stimulating growth is quite high as people will be attracted to those kinds of areas, with strong education, government services, well constructed and maintained infrastructure.

The regulatory and business climate is also very important. Entrepreneurial clusters create their own problems so as the cluster grows with more firms and employees being attracted, plans and progress need to be addressed. For example there could be problems with traffic congestion, pollution and increasing real estate prices which may leave the clusters with negative problems.

In order to improve the entrepreneurial activity in Ireland ICT a business sector within IBEC (Irish Business and Employers Confederation) works on attracting investment into Ireland and improving standards and opportunities that already exist. The government in conjunction with these organizations is working on improving the economy and encouraging entrepreneurship. At the moment the main focus is on trying to improve the science and technology innovation in the country and one of the ways to do this is getting the school curriculum at primary level to adopt more science education so interest in this area can be sparked at a young age. Also to encourage more entrepreneurship, Ireland is and has been investing heavily in education, with a total increase in the annual rate of expenditure on education of more than 10% over the last ten years as compared to an EU average of around 3%.⁴² In 1998 the government noticed the trend to move toward biotechnology, information and communications technology so they commissioned a report ‘Technology Foresight’, the report concluded that “A world-class research capability in selected niches of these two enabling technologies is an essential foundation for future growth.”⁴³ In order to put in place this foundation a Technology Foresight Fund was established in 2000, with a budget of 646 million Euro, eight years later the program has been so successful the budget has been increased to 8.2 billion Euro with a great emphasis on industry and academic collaboration and a trend towards innovation networks.⁴⁴ IDA Ireland invested almost 470 million Euros in 2006 which was almost double the investment of the previous year.⁴⁵

In Ireland the SFI (Science Foundation of Ireland) set up a program called the SRC (Strategic Research Clusters), which aims to link scientists and engineers in partnership across academia and industry. They aim to address crucial research questions, foster

⁴² ICT Ireland, Why Ireland Should be your Location of Choice...

http://www.idaireland.com/uploads/documents/External_Publications/ICT_Ireland_Ireland_as_a_location.pdf

⁴³ ICT Ireland, Why Ireland Should be your Location of Choice...

http://www.idaireland.com/uploads/documents/External_Publications/ICT_Ireland_Ireland_as_a_location.pdf

⁴⁴ ICT Ireland, Why Ireland Should be your Location of Choice...

http://www.idaireland.com/uploads/documents/External_Publications/ICT_Ireland_Ireland_as_a_location.pdf

⁴⁵ IDA Ireland, Ireland Investment Agency

http://www.idaireland.com/home/sitetool.aspx?id=3&content_id=1#onesix

development of new and existing Irish-based technology, while growing partnerships with industry. This program has been specifically designed to facilitate clustering and research activities with specific emphasis on the ICT and Biotech sectors.⁴⁶ The program will offer grants for periods of three years with the opportunity of a possible extension for an additional two years if there is a successful scientific and strategic progress review. The grants from the program will range in value from 500,000 Euro to 1,500,000 per year over the three or five year period. Some of the objectives of the program include:

- Create clusters of internationally-competitive researchers from academia and industry.
- Exploit opportunities in science and engineering where the complexity of the research requires advantages of synergy, scale and shared resources that clusters of research can provide.
- Facilitate the development of new research partnerships and the strengthening of existing partnerships between academia and industrial researchers.
- Build interdisciplinary links among researchers
- Create awareness among academic-based researchers of industrial road maps and research goals.
- Support excellence in research as measured by international merit review.⁴⁷



Taiwan has strong industrial clusters, and a lot of attention has been given to their country's cluster manufacturing model recently. There was a program created by the Taiwan External Trade Development Council (TAITRA) entitled 'Industry Cluster International Market Development Center Program' that has helped to develop some of the clusters that exist in Taiwan. The development program has helped to attract large manufacturers from Japan, Russia, Mexico and Brazil who have an interest in Taiwan-manufactured goods, such as industrial-grade screws and nuts, hosiery, and saxophones. Taiwan has gained strong recognition for its use of the cluster model for manufacturing from the World Economic Forum's 2007-2008 Global Competitiveness Report, where

⁴⁶ Science Foundation Ireland, Strategic Research Clusters (SCR) 2008, http://www.sfi.ie/content/content.asp?section_id=675&language_id=1

⁴⁷ RDFunding SFI, Strategic Research Cluster (SRC) Programme Details, <http://www.rdfunding.org.uk/Queries/ListGrantDetails.asp?GrantID=10278>

Taiwan was ranked first in the world on the report's 'State of Cluster Development' index. Some of the clusters that exist include, screw and nut manufacturing (Kaohsiung), bicycles (Taichung), yachts (Kaohsiung), automotive parts (Tainan), saxophones (Houli), and faucets (Lugang).⁴⁸ Taiwan has a strong industrial policy and also a high importance is placed on the high-tech industry including the communications industry, the information industry, the consumer electronics industry, the semi-conductor industry, the precision machinery and automation industry and the aviation industry etc. Taiwan has high amounts of capital investment and government investment in these areas. This emphasis on non-traditional industries can also cause some concerns. Taiwan's high-tech industry is mainly OEM (original equipment manufacturing) and this kind of industry requires a large amount of capital for its construction but will yield low added value until its maturity, due to high construction costs, licensing costs, the emergence of other lower cost OEM locations etc. Another body working to facilitate development in the technology industry in Taiwan is Taiwan's Industrial Technology Association (TITA) who held a forum recently on Taiwan's high-tech industry development. The forum discussed industry innovation and international research as well as issues such as branding, funding, government involvement, non-brand manufacturing, management and Taiwan's image to the world.



The National Science Council of Taiwan administered a division to oversee the development of Taiwan's science parks. At the moment the science parks attract high-technology industries. The Science parks have been planned as special purpose areas. Currently the Hsinchu Science Park and the Southern Taiwan Science Park have been designed especially for high-technology industries and are in full operation, with another Science Park open in Taichung but still in the developing stages. The Southern Taiwan Science Park including Tainan Science Park and Luchu Science Park was originally planned as an agricultural biotech center and extends the high-tech development further south. In 2003 the Nankang Software Park located east of Taipei opened and is home to many software development companies and high-tech enterprises. This park saw the development of the first R&D focused biotech center in Taiwan. Taiwan has also

⁴⁸ Department of Investment Services, Industry clusters attracting international procurement, <http://investintaiwan.nat.gov.tw/en/news/200802/2008022201.html>

developed the Taiwan Orchid Plantation, which is focused on orchid production and has developed internationally recognized production technologies in automation and mass cultivation with future plans to establish an orchid-focused science park in the Southern Taiwan Science Park. An area of Taipei that is not quite a science park but an industrial area is Neihu District which is a newly developed industrial area and home to many biotech companies.⁴⁹ Many universities are located near these Science Parks and industrial areas and work in conjunction with the companies and research facilities there to create further high tech developments, qualified graduates and meaningful research.

In Ireland there are ten business incubator centers dotted around the country and 19 campus business incubation centers, six campus bioIncubation Programs, one technology incubation centre located in Donegal, a number of commercial technology parks as well as one science-park located in Limerick.⁵⁰ There are also a number of networks in place that aid and facilitate cooperation between enterprises regardless of whether they are in the same geographical location. Networks in Ireland usually consist of between 5 and 10 companies generally from the same region or town who produce similar or complementary products or are competing in the same industrial sector. The main aim is to be able to conquer markets that may be beyond their individual reach and that the network can assist in the role of facilitating cooperation.

⁴⁹ Biotech East, Taiwan's biotech-focused Science Parks, <http://www.biotecheast.com/index.php?module=htmlpages&func=display&pid=5>

⁵⁰ SPICA Directory Online, Business Incubators/Technology Parks <http://www.spica-directory.net/centers/?c=27>

4.4 Strategy, Structure and Rivalry

Porter (1990), there are many dynamic conditions that affect an economy and it is through competition that firms work for improvements in productivity and innovation.

Porter argues that vigorous domestic rivalry is associated with competitive advantage and that success does not grow from one or two firms experiencing economies of scale due to their dominance of the market because only in a closed economy will dominance be profitable. Domestic rivalry creates pressure to innovate and upgrade as local competitors imitate new ideas which results in the whole industry benefiting from overall industry innovation.

In the Irish economy rivalry can be created by the fact indigenous firms are small and so sometimes too weak to compete with larger multinational companies located there. This is mainly because the larger companies will have the backing of their outside parent companies, which in turn leads to more sophisticated industrial activity from the larger companies which eventually will result in innovation for the indigenous firms. Imitation of ideas, can be restrictive for Irish companies however as some of the larger companies that settle in Ireland are under no obligation from the government to give access to these technologies or try to integrate them, the indigenous firms are at a disadvantage compared to some other countries that do this.

Taiwan's free market philosophy has created an innovative, dynamic nation that is focused on technology. Rivalry is quite high in Taiwan as companies compete for big contracts. Individuals base their career on the opportunities and prestige that exists in certain industries, if the perception is favorable it makes maintaining a steady stream of labor easy and encourages investment in this area. Taiwan is great at imitating ideas and recreating products and the need to improve products and compete has given Taiwan the advantage in this area.

For entrepreneurs to become successful in an economy attention needs to be paid to innovative opportunities that are available at an industry level and also in the society as a

whole. (Drucker 1985) outlined seven sources for innovative opportunities for entrepreneurs in a society. The first element is the unexpected, a unique opportunity can be created from an unexpected success or an unexpected failure or even caused by some outside event. The second element that can create an innovative opportunity is the incongruity, which is basically a discrepancy between reality and what everyone assumes it to be, or what it actually is and what it ought to be. The next innovative element is innovation based on process need, this refers to a weak link that is present in a particular process, but instead of people doing something about it they accept it and work around it which creates an opportunity for the company that is willing to supply the solution to the “missing link.” Changes in industry or market structure can create an innovative opportunity because when the underlying foundation of an industry or market shifts, it creates an opportunity for a new service or business approach. The changes in perception, mood and meaning can create innovative opportunities as they can develop when a society’s general assumptions, attitudes or beliefs change. Having new knowledge creates advantages in scientific and non scientific knowledge which can create new products and new markets. So for entrepreneurs looking for new sources of innovation or opportunity in a society it would be worth taking note of these seven elements.

To take advantage of innovations in society (Drucker 1985) came up with five principles. Firstly analyze the opportunities, secondly analyze the opportunity to determine if people will be interested in using the innovation. Thirdly to make the innovation effective the innovation must be simple and clearly focused on a specific need. Fourthly to have an effective innovation, you must start small, by appealing to a small, limited market a product or service will require little money and few people to produce and sell it. When the market grows however the company has time to fine-tune its processes and stay ahead of the emerging competition. Lastly Drucker believes you should strive for market leadership, if an innovation doesn’t aim at leadership at the beginning, it is unlikely to be innovative enough to successfully establish itself. So in this case leadership can refer to domination of a small market niche.

4.4.1 Strategy

Ireland has put in place an ambitious agenda to try to monitor and maintain some of the growth over the last few years. The strategy that was created to maintain growth and employment in Ireland was created to develop world class skills, education and training, attractive taxation regime, effective agile government, expertise in markets meaning international marketing and sales, expertise in technology-product and service development. Ireland has relied on the first three factors in the past and they have continually been mentioned as the backbone of Ireland's success and it is up to policy makers to ensure that they continue with progressive strategies to ensure they can remain competitive. The last two areas reflect the growth opportunities which Irish policymakers have chosen to target competitive advantages that Ireland hopes to gain to try to build expertise in technology products and service development. There are a web of institutions and initiatives that are now responsible for leading the way in the fight for competitiveness. Ireland has decided to leverage its competitive advantage in science and technology which is important and the future of the country depends on how well the transition to an idea that knowledge and ideas are more important than bricks and mortar. All economic regions are trying to capitalize on new technologies and new markets so to succeed it is important to be more creative and flexible than the competitors. Some of the strategies that have been put forward include, increasing public funding for applied research conducted in-firm or by universities through joint collaboration, the allocation of public funds to support the creation of business networks, formulating a national research and innovation strategy with the support of all the stakeholders in the national innovation system, creating a long-term strategic infrastructure investment plan to address current and future needs of industry including broadband, national roads, waste management, air services and energy. To be able to meet the objectives Ireland should act to promote a national pro-innovation culture, encourage more R&D not only in the private sector but also in the public sector, and create a highly attractive environment for researchers. But in order to become a leader in R&D, Ireland must create an innovation-friendly environment to ensure that some essential elements such as a quality education system and key infrastructure components such as telecommunications are in place. This will help to create more of a focus on advanced research which is essential in guaranteeing

that growth and quality are maintained and that more employment can be generated from it. Education is very important and increasing the number of science and mathematic graduates may have an effect on the economy. Many firms might find it daunting to fund their own research and in some cases it takes several years to generate a payoff in the marketplace but this just further highlights the issue that the government should be providing more state support.

Taiwan has entered a knowledge based economy aided by the developments of recent times such as the internet, e-commerce and IT, which has provided SMEs with a new operating model and further enhanced the efficiency and speed of business operations and economic strategies. Since joining the WTO the economic environment has become more liberalized, and the government has been continuing its vision for national development and building Taiwan into a green silicone island. Taiwan has realized that its success lies in its creation of information, telecommunications and other high technology industries. The more labor intensive industries have been gradually replaced by capital and technology intensive industries. Taiwan is looking for a new miracle or at least an extension to the one that they have experienced over the last few years. Taiwan is heavily dependent on trade and there has been the need to keep its trading patterns up to date so as to not lose out to lower cost countries such as China or India. There needs to be strong encouragement to expand their corporate operations into areas other than China. Other strategies the government has undertaken include increasing the labor force participation, Taiwan hopes to improve the quality of professional training and encourage more women and elderly to stay in work. Taiwan is also looking at recruiting more skilled professionals from overseas and having regulations regarding their employment relaxed. Industrial zones will be better planned with scientific research budgets used more effectively. One of the key areas of strategy improvement will be using market mechanisms to promote business restructuring toward low energy consumption which will make Taiwan a responsible green global citizen. The ultimate goal of economic development is to elevate the standard of living through economic growth, distribution of wealth, and quality of life. Taiwan's economic development is worth noting as not only did the country overcome numerous hardships and struggles rebuilding its war-torn

economy, dealing with its limited resources and embracing the fact they are an island but many of its economic policies are models for other developing countries.

4.4.2 Market Structure

In 2007, the market growth in Ireland was at a steady 5%.⁵¹ This year the growth is expected to slow with an estimated Gross National Product growth rate of only 2.3%.⁵² The slow economic growth will be reflected in the labor market where employment is too expected to have low growth and is estimated to increase by less than 0.5%, while unemployment is expected to rise by 5.8%.⁵³ There is also affects expected to be seen worldwide with slowdowns in all the worlds major markets, including the UK, the US and the Euro Area.

Ireland has a large amount of small to medium sized enterprises, SME's in Ireland are defined by the fact that they employ fewer than 50 people and their annual turnover doesn't quite reach 10 million Euro, while a micro enterprise is defined as an enterprise that employs fewer than 10 persons and whose annual turnover does not exceed 2 million Euro.⁵⁴

In Ireland over 97% of businesses are classified as small, which adds up to about 226,000 companies. The number of small businesses has grown over the last decade by more than 50%. In 2005 Ireland had the highest rate of new business start-ups in the European Union. It is estimated to be about 777,000 people working for businesses that employ less than 50 people. This represents a total of 53.3% of people employed in the enterprise sector, and 39% of the total Labor Force. Small businesses make a substantial

⁵¹ Budget 2007, Department of Finance,
http://www.budget.gov.ie/2007/financialstatement.html#_Toc153132248

⁵², ³¹ Finfacts Ireland, Ireland Economy Irish Economic News Reports Celtic Tiger
<http://www.finfacts.com/econ2000.htm>

⁵⁴ Ministry of Economic Development, SMEs Internationally
http://www.med.govt.nz/templates/MultipageDocumentPage_____28588.aspx

contribution to the Irish economy. The construction sector and the services sectors are the biggest contributors.⁵⁵

In 2007, the market growth of Taiwan was at a strong 5.5% up from 4.9% in 2006.⁵⁶ The reason for such growth was due to merchandise exports, which grew by as much as 10% due mainly to a sustained demand for the electronic products produced by Taiwan. Unemployment was a low 4% which has strengthened consumer confidence, and expanded consumer spending. Manufacturing in Taiwan has decreased in recent years with a lot of Manufacturing moving to low-cost regions, such as mainland China, but manufacturing still accounts for a considerable amount of GDP, while the services sector accounts for almost 70% of total GDP.⁵⁷

In Taiwan the definition of SMEs as of July 5, 2005, is that the company will earn less than US\$2.42 million or US\$3.03 million depending on the sector. The number of employees must be less than 50 or in areas such as manufacturing, construction, mining and quarrying the number of employees must be less than 200.⁵⁸

There are over 1,244,000 SMEs in 2006, and they accounted for 97.7% of the 1,273,000 enterprises in Taiwan. In the last two years there has been an increase in the number of larger enterprises so the growth of SMEs' fell slightly.⁵⁹

⁵⁵ Ministry of Economic Development, SMEs Internationally

http://www.med.govt.nz/templates/MultipageDocumentPage___28588.aspx

^{56, 55} Hong Kong Trade Development Council, Market Profile on Taiwan, Major Economic Indicators
<http://www.tdctrade.com/mktprof/asia/mptai.htm>

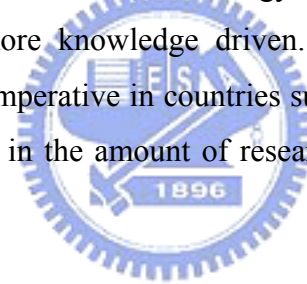
⁵⁸ Small and Medium Enterprise Administration, Ministry of Economic Affairs, Definition of SMEs
<http://www.moeasmea.gov.tw/ct.asp?xItem=70&CtNode=261&mp=2>

⁵⁹ Small and Medium Enterprise Administration, Ministry of Economic Affairs, Definition of SMEs
<http://www.moeasmea.gov.tw/ct.asp?xItem=70&CtNode=261&mp=2>

4.5 Role of the Government in Creating an Entrepreneurial Society

The role of government according to Porter is to influence the four determinants through its policies. The government acts as a catalyst and a challenger to encourage or push the economy in certain directions. The government provides subsidies to firms, either directly or indirectly through fostering an infrastructure for growth. The government plays a role with the tax and competition laws that they present to a country and the educational policies that they implement.

Governments in both Taiwan and Ireland are seeking to generate economic renewal and growth, and one of the key ways of achieving this is through innovation and entrepreneurship. In the globalized world, technology advancements are accelerating and all countries are becoming more knowledge driven. Developing an entrepreneurial capacity has become a policy imperative in countries such as Taiwan and Ireland. There has been a significant increase in the amount of research being generated and levels of innovation achieved.



The government in Ireland has spent the last number of years improving the economy with a series of national economic programs designed to curb inflation, reduce government spending, increase labor force skills, promote foreign investment and focus on entrepreneurship. The change in Ireland began when Ireland entered the European Union in 1973, and in the years that followed rewrote tax policies to recruit foreign investment by American Corporations, made all education free through to university level, changed tax rates and used direct equity investment to encourage Irish people to set up their own businesses. In 1987 the government offered more help to entrepreneurs by lowering personal taxes. Corporate profits are taxed at 12.5% which is definitely an incentive to own a business and also offered support for the development of the economy with many venture capital firms and sources of angel investors stepping in to help with start up capital for new firms. Enterprise Ireland an institution that was put in place to

help transform Irish industry and entrepreneurs set up their own SMEs has helped many people start their own enterprise through capital investment, funds, research and development supports. Irish Development Authority (IDA) is another state agency responsible for attracting and growing foreign multinational businesses. These government agencies work in conjunction with many companies to promote and improve innovation and economic development.

In March this year the government announced a Euro60m growth fund that will be implemented to support Ireland's small and Medium Sized companies. The growth fund will be operated by Enterprise Ireland and will help secure new jobs in Irish firms by supporting investments in technology, equipment and staff to increase competitiveness and encourage new exports.

Announcing the details of the Growth fund Michael Martin, the Minister for Enterprise, Trade and Employment said;

“Innovating to improve competitiveness has become a national priority in the face of growing international pressure. I welcome Enterprise Ireland’s Growth Fund which will help our SME sector to increase productivity and exports whilst also creating new jobs”.

“As SMEs make up over 97% of the Irish business sector, it is imperative that they have the capacity and capability to innovate and grow. This Enterprise Ireland fund underlines the determination of Government to continue supporting Irish firms as they prepare to meet the challenges of the future.”⁶⁰

In Ireland there is a focus to encourage entrepreneurship at every level of the education system as well as community interaction. Entrepreneurial initiatives have been incorporated into the curriculum at all levels of the education system in Ireland in order to cultivate innovation in society. At Primary level education, there are two enterprise education initiatives, at secondary level there are twelve and at third level there are undergraduate degrees in enterprise courses, entrepreneurship and postgraduate courses

⁶⁰ S. Heaphy, Mar 1, 2008, Martin announces Euro60m Fund to boost SME's, <http://www.forfas.ie/publications/forfas071023/entrepreneurship-press-release-sept-2007.pdf>

in entrepreneurship. There are also the incubation centers at third level institutes as well as other research affiliations such as Ireland's Network of Teachers and Researchers in Entrepreneurship.

There are many entrepreneurship awards to encourage interest and participation, two at the second level education system, four at third level as well as five non education related general enterprise awards and four other specific awards including, Dublin City Enterprising Woman Award, Veuve Vlicquot Business Woman of the Year, Permanent TSB Ethnic Minority Entrepreneur of the Year and the JFC Awards.

Over the last few years Ireland has started initiatives for start-ups and training to encourage innovation and develop the entrepreneurial culture. Presently there are nine general start-up initiatives for SMEs including, County Enterprise Boards, Enterprise Ireland, Shannon Development, Udaras na Gaeltachta, County Enterprise Funds, Department of Social Welfare, Business Innovation Centres and First Step. There are also training courses specializing in entrepreneurial training including County Enterprise Boards, Enterprise Ireland, FAS, startingabusinessinireland.com, and Teagasc.

Because of Ireland's changing dynamics with more immigrants settling and more females entering the workforce, there are specific initiatives set up to facilitate these groups. Some female specific initiatives include County Enterprise Boards, E-Learning for Female Entrepreneurs, Gender Equality Unit and First Step Microfinance. For immigrants, there are programs such as Immigrant-specific Initiatives, Equal Emerge, Institute for Minority Entrepreneurship and First Step Microfinance.

There has been public sector support for entrepreneurship with the creation of 35 County and City Enterprise Boards (CEBs). The CEBs were established in 1993 and provide a source of support both financially and non-financially for small businesses with 10 employees or less. There are a number of feasibility study grants that can be gained including research and development, prototype production, test marketing, consultancy advice, financial projections, the preparation of formal business plans and in general finding out whether a service or new product should progress to the production stage. In

addition to the financial supports, there are non-financial supports that provide training and development programs, advice and mentoring.⁶¹

In Taiwan there are many initiatives and programs that facilitate the development of entrepreneurship and innovation in the society. In 1981 the government dedicated a governmental body, the Small and Medium Enterprise Administration, which was set up under the Ministry of Economic Affairs to assist the development of SME's. This body was in charge of assisting the SMEs in improving their operational environment and structural transformation while increasing their access to financing. The organization also worked on helping with areas such as automation, production technology innovation and personnel training. In the 1990s the government's initiative became more proactive and they began helping SMEs to upgrade to meet new industry challenges. There was a new Statute for Development of Small and Medium Businesses in 1991, which became the main statutory basis of SME assistance. Under this statute a development fund was set up in order to assist in the development of medium and small businesses. The government also set up a fund to guarantee loans to small and medium businesses that were short of collateral. The fund was opened up to financial institutions to donate capital and by 1998, 10,749 companies had been recipients and the amount guaranteed was NT\$1,885.8 billion.⁶²

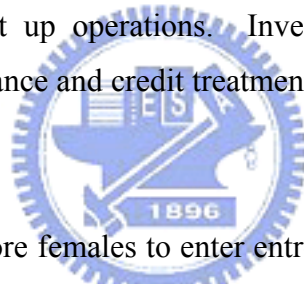
Taiwan has welcomed FDI, with the government trying to promote investment by foreigners and overseas Chinese to supplement the limited capital for economic development. To encourage FDI the government removed the existing constraints that were in place for investors, including procedures, expatriation of capital and profits, and credit. The increased FDI influenced the development of local SMEs and more opportunities became apparent. Firstly, production techniques and trade opportunities for SMEs improved, components and parts were more available domestically thus reducing the need for importing, a network formed with the SMEs and the new multinational companies and opened the SMEs up to the idea of international trade, finally a diffusion

⁶¹ Forfas, Mapping of Initiatives to Support Entrepreneurship in Ireland, October 2007
<http://www.forfas.ie/publications/forfas071023/mapping-of-irish-entrepreneurship-initiatives.pdf>

⁶² Rong-I Wu and Chung-Che Huang, Entrepreneurship in Taiwan: Turing Point to Restart.
http://www.mansfieldfdn.org/programs/program_pdfs/ent_taiwan.pdf

affect occurred as former employees of foreign companies were experienced enough to create their own SMEs.

Regulations governing the SMEs were low as the government allowed the SMEs to flourish and a free market system allowed the enterprises to fully realize their comparative advantage of flexibility and resilience. There was many laws created to encourage nationals to become involved in business such as the Statute for Encouragement of Investment 1960, Statute for Establishment and Management of Export Processing Zones 1965, the Statute for Establishment and Management of Science-Based Industrial Parks 1979, and industrial development was emphasized and developed with the creation of the Export Processing Zones (EPZ) and the Hsinchu Science-based Industrial Park (HSIP). These laws worked as a framework for the investment environment, simplified the bureaucratic procedures and were attractive to new companies wishing to set up operations. Investors were also given some tax exemptions and preferential finance and credit treatment and the EPZ and HSIP became a hot breeding ground for SMEs.



The government encourages more females to enter entrepreneurship and set up programs to reinforce this, one program set up in 2000 was executed through the Taiwan-Based China Youth Career Development Association (CYCDA). The program helps develop skills and entrepreneurial spirit among young people and has helped to launch more than 20,000 SMEs. The CYCDA operates 20 offices around the island and sponsors seminars, training workshops and informal gatherings to help young people start up their own businesses and make timely adjustments as their businesses mature while bringing aspiring entrepreneurs together with successful business leaders.⁶³ The government has also in an effort to improve innovation set up two key organizations Institute for the Information Industry (III) and Industrial Technology Research Institute (ITRI), both are responsible for incubation of new SMEs and the development of new information

⁶³ Cecilia Fanchiang, Youth commission takes steps to boost female entrepreneurs, <http://www.gio.gov.tw/fp.asp?xItem=28593&ctNode=3243&mp=807>

technology and software, transferring knowledge to private firms and forming alliances with foreign partners.⁶⁴

4.5.1 Competition Law

Taiwan's competition law was drafted in the early 1980s when the government was developing policies for economic liberalization and internalization while the transformation of the economic structure into a competitive market economy was taking place. The reason for the revision was due to the fact that Fair Trade Law would have a significant impact on business operations, the law took five years to enact and was enacted on February 4, 1991, with enforcement a year later, and amendments in February 1999, April 2000 and February 2002.⁶⁵

The Fair Trade Law had many objectives, its main focus was to ensure fair competition, maintain trading order, protect consumers' interests, and promote the stability and prosperity of the economy as a whole. Some of the restrictive practices included, unfair trade practices and multi-level sales including monopolies, mergers, concerted actions, resale price maintenance, boycott and discrimination. Unfair trade practices include counterfeiting, untrue or misleading advertisements or presentations, business disparagement, and other deceptive unfair actions.

The Fair Trade provisions, allows the existence of monopolies as long as they do not abuse their dominant market power. The law also allows the mergers of businesses as long as they are below a certain size otherwise they have to file with the Fair Trade Commission. If the commission raises no objections the parties are free to merge. Concerted actions are prohibited but in certain situations exceptions may be made if it is felt that it will benefit the economy as a whole, such exceptions include promotion of

⁶⁴ Ganeshan Wignaraja, *Promoting SME Exports in Developing Countries*, Maxwell Stamp PLC, 23 November 2003.

⁶⁵ Global Competition Forum, Asian Laws, Taiwan, <http://www.globalcompetitionforum.org/asia.htm#taiwan>

joint research and development, rationalization of operations, boosting of international trade, combating recession or assisting small and medium-sized businesses.⁶⁶

Ireland's competition Law was derived from two sources statutes enacted by the Irish Parliament and common law. Irish competition law must conform with EC competition law. EC law has both superiority and persuasive force over Irish competition law.

This means that if there are any conflicts between Irish and European competition laws, the European law will take precedent.⁶⁷

The Irish competition Authority is the statutory body that administers the regime and the law is embodied in the Competition Act 2002. The act was signed into law by the President in April 2002 and has had amendments in 2006. The key provisions of the law are to usually outlaw anti-competitive arrangements between undertakings and associations of undertakings, always outlaw the abuse of dominance by undertakings, and control certain mergers and acquisitions. The act specifies decisions about concerted practices, which may prevent, restrict or distort the competition in trade in any goods or services in the State. There are a number of behaviors that are prohibited including price fixing, limiting or controlling production or markets, share markets or sources of supply, applying dissimilar conditions to equivalent transactions with other trading parties, attaching supplementary obligations to a commercial contract which has nothing to do with the subject of the contract. There are also restrictions about the abuse of a dominant position.⁶⁸

4.5.2 Tax Policies

Ireland rewrote its tax policies after they joined the European Union in 1973. The reason for this was to attract foreign investment from American corporations. The government

⁶⁶ Global Competition Forum, Asian Laws, Taiwan,
<http://www.globalcompetitionforum.org/asia.htm#taiwan>

⁶⁷ The Competition Authority, Irish Competition Law,
<http://www.tca.ie/EnforcingCompetitionLaw/CompetitionLaw/IrishCompetitionLaw/IrishCompetitionLaw.aspx>

⁶⁸ Global Competition Forum, European Laws, Ireland
<http://www.globalcompetitionforum.org/europe.htm#ireland>

decided to make all education free through to university level and changed taxation policies, they also used direct equity investment to encourage Irish people to set up their own businesses. During the 1990's tax and interest rates came down. Income tax rates in Ireland are 20% on the first US\$50,000 of income and 41% on income above that. These rates are still quite low as compared to many other countries. All goods and transactions have a 21% levy except for health and medical services, children's clothing and food. The tax on corporate profits is between 10% and 12.5%, which gives the incentive to own a business and encourage entrepreneurship.⁶⁹ The Irish Tax system's main role is to pay for current expenditure programs, such as universal free education up to and including third level, free healthcare, old age pensions, unemployment benefits, and public capital expenditure, such as the National Development Plan.

Taiwan has also used its Taxation policy to encourage investment. Some of the methods used include raising the retained earnings of companies, and promoting complicated tax codes to promote investment in certain industries. The low interest rates have also helped promote investments because it helped to lower the cost of borrowing. The taxation system has set the maximum rate of corporation tax at 25%. There is a 20% withholding tax that is levied on dividends, interest, royalties and fees. Income tax is progressive and rates are between 6 - 40%. The value-added tax rate is 5% but that is likely to rise in the future.⁷⁰

⁶⁹ The New York Times, James Flanigan, Entrepreneurship Takes off in Ireland, Jan 17th 2008

⁷⁰ Economist.com, Country Briefings, Taiwan Factsheet, Mar 7th 2008,
<http://www.economist.com/countries/Taiwan/profile.cfm?folder=Profile-FactSheet>

5 Statistical Analysis

5.1 Questionnaire Design

The questionnaires were used to gather a general opinion regarding citizen's in Ireland and Taiwan and their perception of the innovativeness of their country, their general opinion about entrepreneurship and their views about their own skills. The questionnaires were completed by 30 random people from Taiwan and 30 random people from Ireland of different ages and different educational backgrounds. The aim of the questionnaire was to see if the results from the general public correlated with the reports and analysis that was conducted throughout my thesis research and see which country's citizens perceives themselves more innovative. (See Appendix 4 for Questionnaire)

The questionnaire had one qualifying question, which meant that only Taiwanese or Irish people could take part in the survey. The reason for this was to ensure that it was only the citizens of the country and their views on their own country that would count. The next section of the questionnaire asked respondents to enter some basic data so that groups could be created for statistical purposes. The basic personal data included gender, occupation, firm/business type, educational level and age.

The questionnaire then consisted of ten questions related to innovation and entrepreneurship to which people had to answer in the format of a typical five-level Likert scale; strongly agree, agree, unsure, disagree or strongly disagree. Data from the Likert scale can then be easily reduced to the nominal level by combining all agree and disagree responses into the two categories.

The questions began by firstly asking respondents do they feel their country is innovative. The second question asked about their perception of the amount of entrepreneurs in their own Country, the third question asked if they believe that entrepreneurship is a good career choice. The fourth question probed the respondent as to their own skills and asked do they feel they have the skills necessary to become an entrepreneur. Next the questionnaire asked about their awareness of society's perception of entrepreneurship, by asking do they feel there is a stigma attached to entrepreneurs who fail. The

questionnaire then moved on to the question of support by asking does the government do enough to support entrepreneurs in society. The next question asked people if they believe there are many entrepreneurial opportunities in their society. The next question asked about the media's role in highlighting entrepreneurs. The ninth question asked whether the respondent is or personally knew entrepreneurs in their society and the final question asked respondents if they would consider becoming an entrepreneur themselves.

5.2 Analysis of Results

There were a total of sixty respondents, thirty from Ireland and thirty from Taiwan.

The respondents from Ireland consisted of eight Irish females under thirty years of age, seven of which were educated to third level and one who was not. There were eight Irish females over thirty years of age, seven of which had a third level education and one who did not. The Irish males consisted of seven males under thirty years of age who were educated to third level and one who was not. The male over thirty category had seven people who were third level educated. So the respondents were almost equal with sixteen females answering and fourteen males.

Of the thirty Taiwan respondents all of them had been educated up to third level. The sample consisted of three females under thirty years of age, and sixteen females over thirty. There were a total of eleven males one of which was under thirty and ten were over thirty years of age.

5.2.1 Irish Results

Taking the results from all the Irish respondents together the general opinion was:

The general opinion held that (66%) of people agreed or strongly agreed that their country was innovative. This shows that Irish people are proud of the successes of the last few years and that they still consider the country to be innovative. The majority again (66%) of people questioned believed that there are lots of entrepreneurs in their

country. This holds with the GEM, Global Entrepreneurship Monitor 2005 Irish Report which stated that Ireland was one of the leading countries in Europe for the number of early stage entrepreneurs. In 2005 almost one in ten adults living in Ireland was actively planning or had recently set up a new business. A little over half the people surveyed believed that entrepreneurship was a good career choice with (56%) agreeing, while (23%) were a little more reserved and answered unsure to this question. Again a little over half the people surveyed (56%) believed that they had the necessary skills to become an entrepreneur while (23%) were unsure. This shows a strong self belief in their skills and a positive attitude towards the perception of opportunities in their environment. It has been reported that the majority of Irish people feel there is a stigma attached to entrepreneurs who fail but surprisingly (47%) of people surveyed disagreed with this statement, while (30%) felt too unsure to give a solid answer one way or the other. The Irish government has been working to improve the amount of support they offer to new start-ups and entrepreneurs and try to encourage more innovativeness within the country, but the general perception from my survey revealed that (43%) of people disagreed or strongly disagreed that the government does enough to support entrepreneurs while (33%) of people felt too unsure to answer. Ireland being a small country makes entrepreneurship more obvious and so (63%) of people were confident that there are many entrepreneurs in their society. The media has been criticized for not doing enough to highlight entrepreneurs and their successes but half the people surveyed, (50%) believe the media does a good job highlighting the successes of entrepreneurs. The most solid result came from people being asked if they were or if they knew anyone who was an entrepreneur with (80%) of people acknowledging they did. Confidence of the Irish people surveyed was also displayed in the final question when asked whether they would consider becoming an entrepreneur with (73%) agreeing that they would consider it.

Table 5.1 Results of Irish Females, under 30, educated to 3rd level.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	0	17%	6%	0	0
Lots of Entrepreneurs	3%	20%	0	0	0
Entrepreneurship is a good career choice	10%	3%	7%	3%	0
I have the skills to become an entrepreneur	6%	10%	0	7%	0
There is a stigma for entrepreneurs who fail	3%	10%	0	10%	0
The government does enough to support entrepreneurs	3%	3%	3%	11%	3%
There are many entrepreneurial opportunities in my country	3%	10%	3%	7%	0
The media does a good job highlighting entrepreneurs	0	13%	3%	7%	0
I am or know entrepreneurs in my society	3%	20%	0	0	0
I would consider becoming an entrepreneur.	10%	7%	0	3%	3%

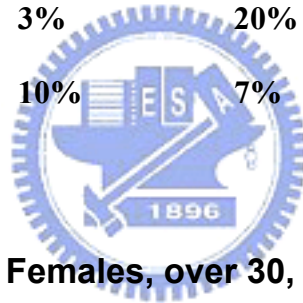


Table 5.2 Results of Irish Females, over 30, educated to 3rd level.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	3%	10%	7%	3%	0
Lots of Entrepreneurs	0	13%	3%	7%	0
Entrepreneurship is a good career choice	0	17%	3%	3%	0
I have the skills to become an entrepreneur	0	13%	7%	3%	0
There is a stigma for entrepreneurs who fail	3%	0	7%	13%	0
The government does enough to support entrepreneurs	0	7%	6%	10%	0
There are many entrepreneurial opportunities in my country	0	13%	7%	3%	0
The media does a good job highlighting entrepreneurs	0	10	3%	10	0
I am or know entrepreneurs	0	17%	6%	0	0

in my society					
I would consider becoming an entrepreneur.	0	20%	0	3%	0

Table 5.3 Results of Irish Males, under 30, educated to 3rd level

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	0	13%	3	3%	0
Lots of Entrepreneurs	0	13%	3%	3%	0
Entrepreneurship is a good career choice	3%	3%	6%	7%	0
I have the skills to become an entrepreneur	3%	10%	0	6%	0
There is a stigma for entrepreneurs who fail	0	0	10%	9%	0
The government does enough to support entrepreneurs	0	10%	3%	3%	3%
There are many entrepreneurial opportunities in my country	0	10%	9%	0	0
The media does a good job highlighting entrepreneurs	3%	10%	0	6%	0
I am or know entrepreneurs in my society	3%	13%	0	3%	0
I would consider becoming an entrepreneur.	3%	10%	3%	3%	0

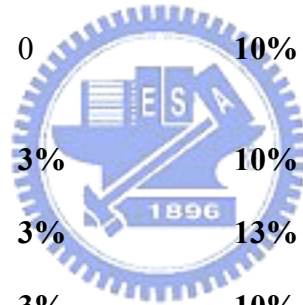


Table 5.4 Results of Males Males over 30, educated to 3rd level

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	3%	13%	0	7%	0
Lots of Entrepreneurs	3%	10%	0	10%	0
Entrepreneurship is a good career choice	0	13%	7%	3%	0
I have the skills to become an entrepreneur	0	10%	13%	0	0
There is a stigma for entrepreneurs who fail	0	3%	10%	10%	0
The government does enough to support entrepreneurs	0	3%	13%	0	7%

There are many entrepreneurial opportunities in my country	0	20%	0	0	3%
The media does a good job highlighting entrepreneurs	6%	7%	3%	7%	0
I am or know entrepreneurs in my society	0	13%	7%	3%	0
I would consider becoming an entrepreneur.	0	17%	3%	3%	0



5.2.2 Taiwanese Results

Taking the results from all the Taiwanese respondents together the general opinion was:

The majority of people surveyed (76%) agreed or strongly agreed that their country was innovative. This shows that the majority of Taiwanese people are extremely aware and confident of the success of their country and the improvements in innovativeness over the last few years. Almost all respondents (93%) believe that there are lots of entrepreneurs in their country which also demonstrates a lot of confidence in their country. Well over half the people surveyed (63%) believes that entrepreneurship is a good career choice while 33% of people were unsure. The Taiwan respondents were very reserved or unconfident in their answering of the question, Do you believe you have the skills necessary to become an entrepreneur? (33%) of people believed they didn't possess the skills necessary while 40% were unsure. This was surprising to me as I expected the Irish respondents to be more reserved but they seemed more confident in their skills with 56% of people believing they could become an entrepreneur.

There may also be a modesty issue with Taiwanese people who maybe don't feel confident enough to admit the level of their skills. Taiwanese people didn't feel that there was a definite stigma attached to entrepreneurs who fail with only (40%) of people agreeing to this statement while 23% of people were unsure. Over half the people surveyed (54%) believe that the government does not do enough to support entrepreneurs while 30% felt too unsure to answer one way or another. The majority of people surveyed believed that there are many entrepreneurs in their society with (76%) of people agreeing to this statement. More than half the people surveyed (66%) believed that the media does a good job in highlighting entrepreneurship in society. Over half the people surveyed were or knew people who were entrepreneurs, this is a big contrast to the Irish result where we saw (80%) of people acknowledging that they were or knew people who were entrepreneurs. Only (40%) of people surveyed would consider becoming an entrepreneur while (35%) of people were unsure. This is also a much lower percentage than the Irish result as the Irish seemed more confident with (73%) of people willing to consider becoming an entrepreneur.

Table 5.5 Results of Taiwanese Females, under 30, educated to 3rd level.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	3%	7%	0	0	0
Lots of Entrepreneurs	3%	7%	0	0	0
Entrepreneurship is a good career choice	0	3%	7%	0	0
I have the skills to become an entrepreneur	0	0	10%	0	0
There is a stigma for entrepreneurs who fail	0	0	3%	4%	3%
The government does enough to support entrepreneurs	0	0	7%	3%	0
There are many entrepreneurial opportunities in my country	0	7%	3%	0	0
The media does a good job highlighting entrepreneurs	3%	7%	0	0	0
I am or know entrepreneurs in my society	0	7%	0	3%	0
I would consider becoming an entrepreneur.	0	3%	7%	0	0

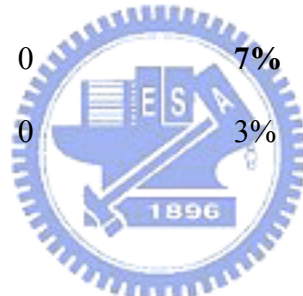


Table 5.6 Results of Taiwanese Females, over 30, educated to 3rd level.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	13%	30%	7%	3%	0
Lots of Entrepreneurs	20%	33%	0	0	0
Entrepreneurship is a good career choice	10%	27%	13%	3%	0
I have the skills to become an entrepreneur	0	10%	23%	20%	0
There is a stigma for entrepreneurs who fail	3%	23%	10%	10%	7%
The government does enough to support entrepreneurs	3%	20%	0	23%	7%
There are many entrepreneurial opportunities in my country	10%	30%	10%	3%	0
The media does a good job	3%	30%	7%	13%	0

highlighting entrepreneurs I am or know entrepreneurs in my society	10%	27%	10%	6%	0
I would consider becoming an entrepreneur.	0	10%	23%	13%	7%

Table 5.7 Results of Taiwanese Males, under 30, educated to 3rd level

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	0	0	0	3%	0
Lots of Entrepreneurs	0	0	3%	0	0
Entrepreneurship is a good career choice	3%	0	0	0	0
I have the skills to become an entrepreneur	0	0	0	3%	0
There is a stigma for entrepreneurs who fail	0	0	3%	0	0
The government does enough to support entrepreneurs	0	0	0	3%	0
There are many entrepreneurial opportunities in my country	0	3%	0	0	0
The media does a good job highlighting entrepreneurs	0	0	0	3%	0
I am or know entrepreneurs in my society	0	0	3%	0	0
I would consider becoming an entrepreneur.	0	3%	0	0	0

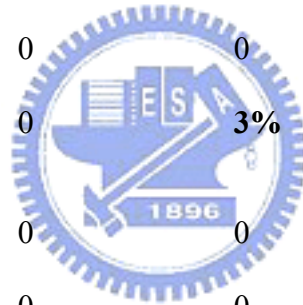


Table 5.8 Results of Taiwanese Males over 30, educated to 3rd level

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Own Country Innovative	7%	16%	10%	0	0
Lots of Entrepreneurs	17%	13%	0	3%	0
Entrepreneurship is a good career choice	7%	17%	10	0	0
I have the skills to become an	7%	10%	6%	7%	3%

entrepreneur					
There is a stigma for entrepreneurs who fail	0	7%	10%	16%	0
The government does enough to support entrepreneurs	0	7%	6%	17%	3%
There are many entrepreneurial opportunities in my country	0	27%	7%	0	0
The media does a good job highlighting entrepreneurs	0	16%	10%	7%	0
I am or know entrepreneurs in my society	0	23%	7%	3%	0
I would consider becoming an entrepreneur.	3%	20%	7%	0	3%



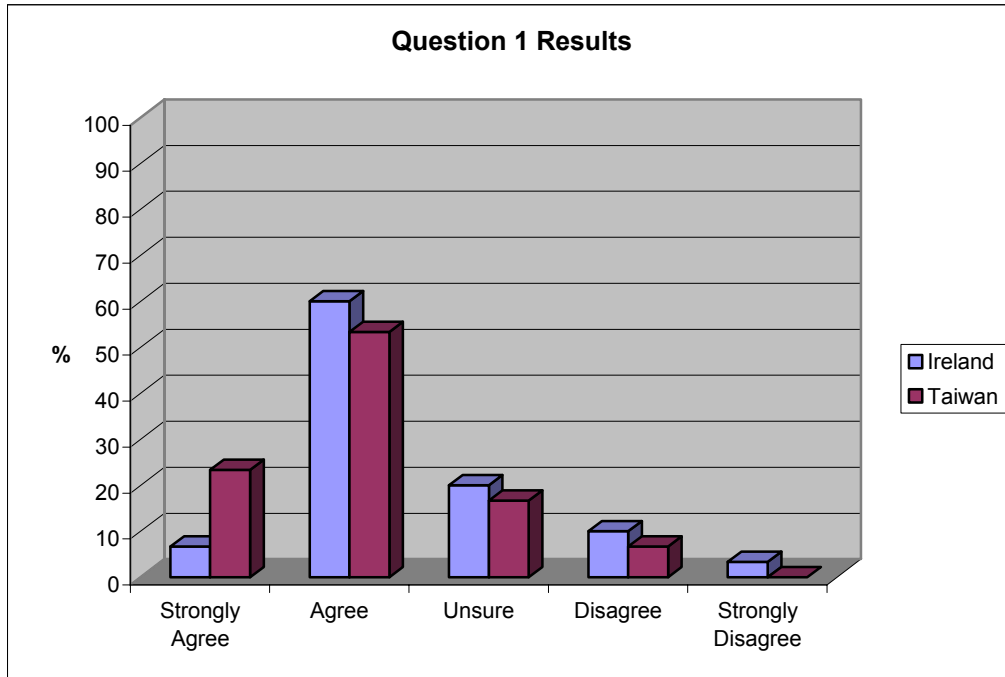


Figure 5-1 Belief in innovativeness of Country

According to the results of the survey Taiwan views themselves as an innovative country more than Ireland does. Some of the reasons for this may be that in Ireland a huge percentage of new innovations come from outside companies as they introduce their technology into the country and create new jobs, but may not actually create the innovations in the country. Taiwan prides itself on its innovativeness and over the last few years has poured an exceptional amount of resources into improving facilities such as incubation centers and university programs to encourage and facilitate innovation. All of this has been well documented and is a source of pride for the Taiwanese.

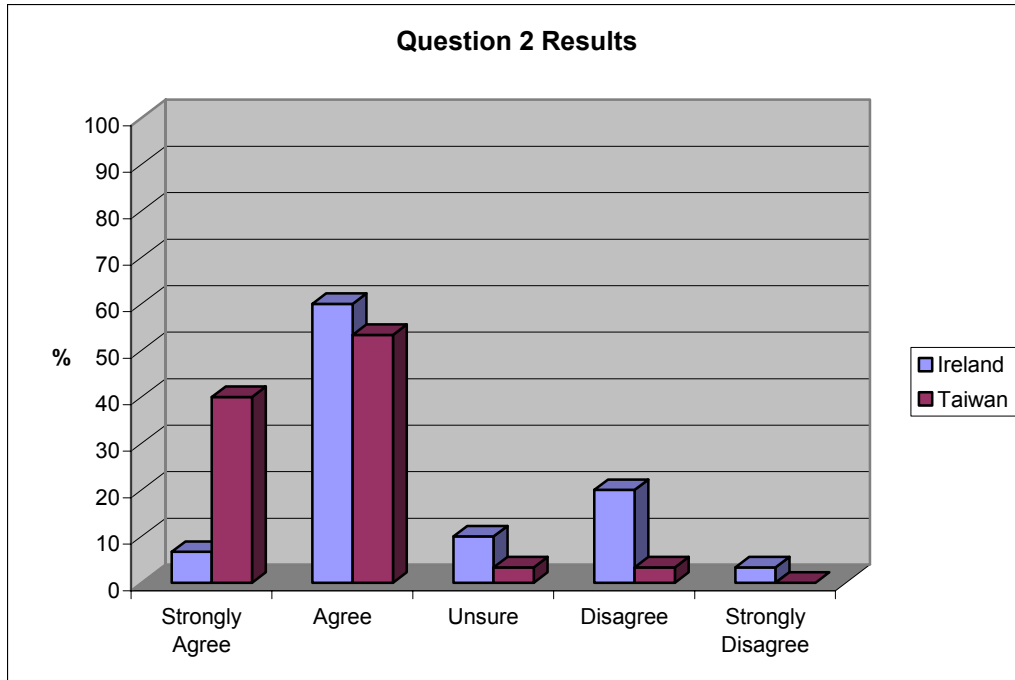


Figure 5-2 Perception of the amount of entrepreneurs in society

These results were quite high and very positive, (93%) of people surveyed from Taiwan believed there was lots of entrepreneurs in their society. Whereas (56%) of people from Ireland believed their society contained lots of entrepreneurs. This shows that Taiwan is very aware of the entrepreneurial situation as in 2006 Taiwan had 1,244,000 SMEs, which represented (97.7%) of all enterprises. Ireland has also one of the highest numbers of entrepreneurs in Europe with (53.3%) of people being employed in the enterprise sector representing (39%) of the total labor force.

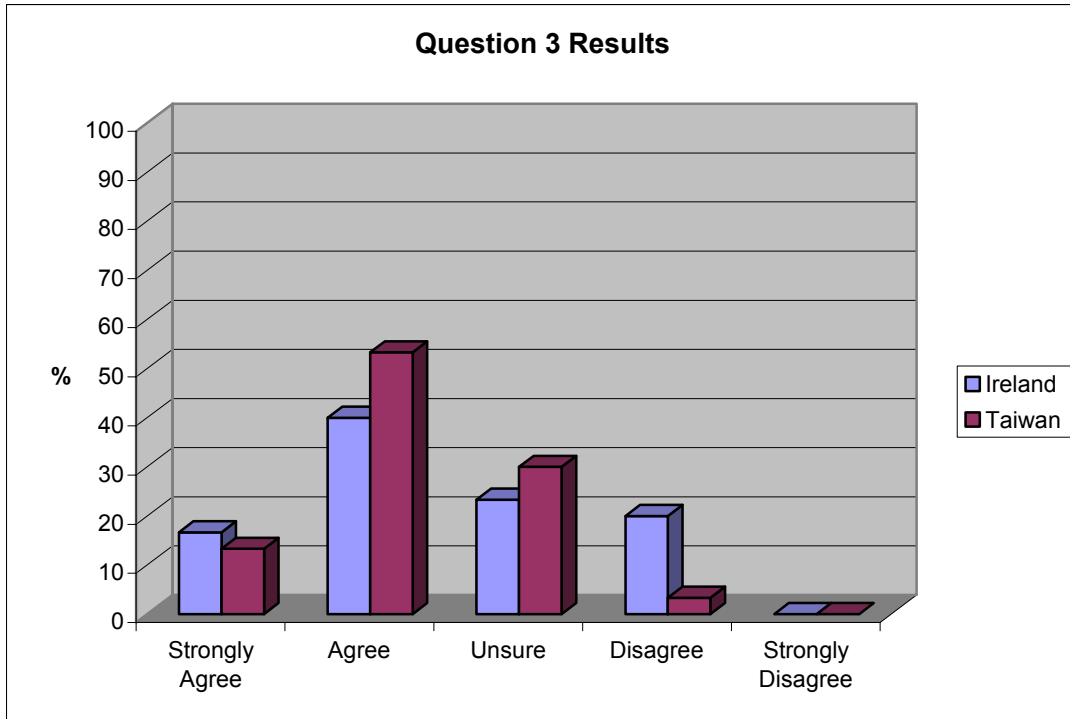


Figure 5-3 Belief that entrepreneurship is a good career choice

This table shows that more Taiwanese people believe that entrepreneurship is a good career choice than Irish people. There were more unsure Taiwanese people however than Irish people and more Irish people that disagreed with this statement than Taiwanese.

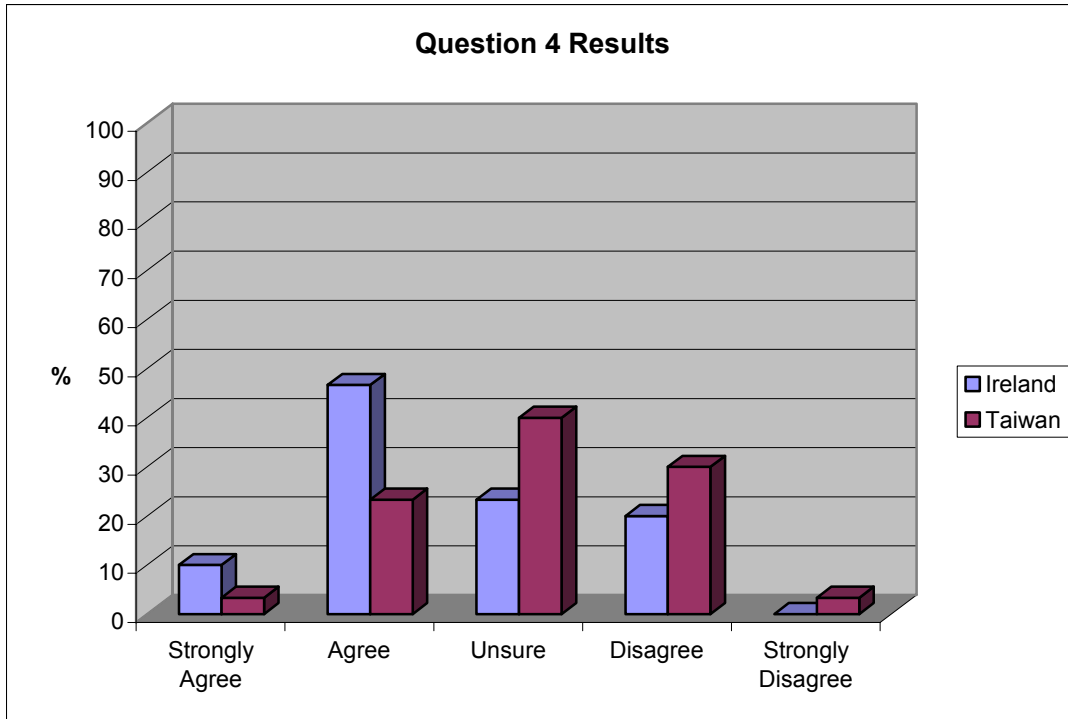


Figure 5-4 Belief they possess the skills to become an entrepreneur

This result showed that Irish people have a strong self-belief in their own skills, which doesn't necessarily mean that they will ever put those skills to the test, but rather they are confident about them. The Taiwanese were a little more reserved with (23%) of people answering unsure and (20%) of people answering that they do not possess the necessary skills to become an entrepreneur.

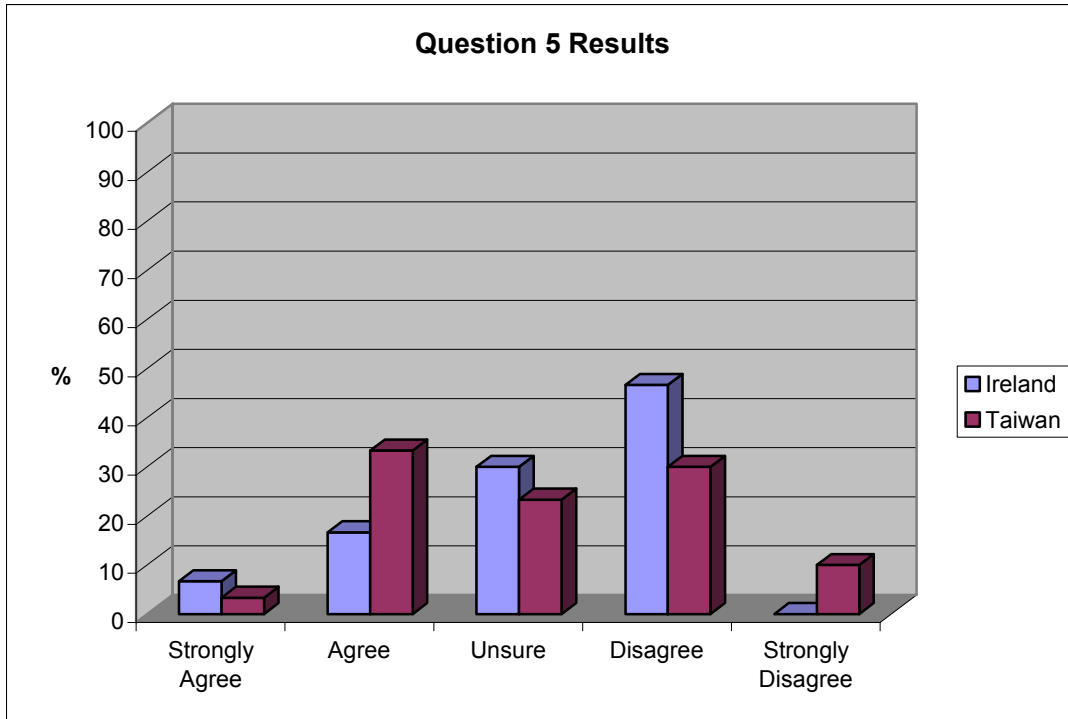


Figure 5-5 Belief that there is a stigma attached to entrepreneurs who fail

This result surprised me as it is reported in Ireland that one of the reasons many people who possess the skills necessary to become an entrepreneur do not attempt to do so is because they have a strong fear of failure and they believe there is a stigma. So because (47%) of people from Ireland disagreed with this statement it means that there may be many other reasons why people who possess the necessary skills don't use them. In the Taiwan results there was a high percentage of the sample that believed there was a stigma attached to entrepreneurs who fail with (33%) of people agreeing, this could be attributed to the culture of "losing face" and being seen to fail in public.

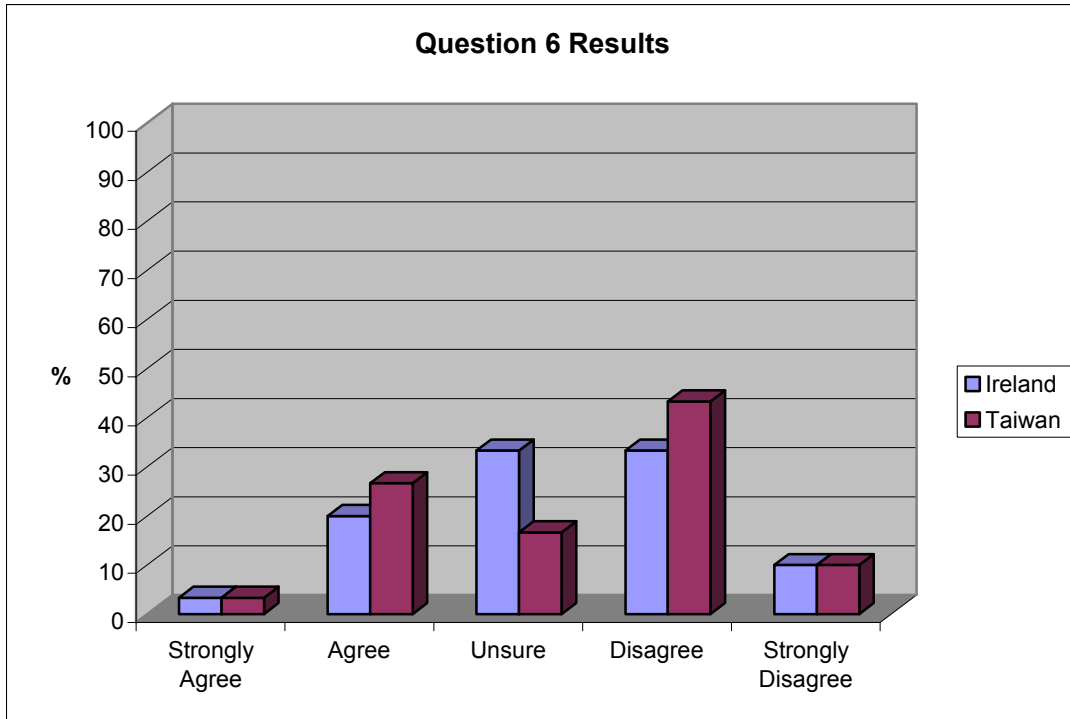


Figure 5-6 Belief that the government supports entrepreneurs

This table shows that many people from both Taiwan and Ireland agree that their government does not do enough to support entrepreneurs. This attitude may change in the future as both governments are placing more emphasis on innovation, education and promoting programs that will encourage more entrepreneurship in the future.

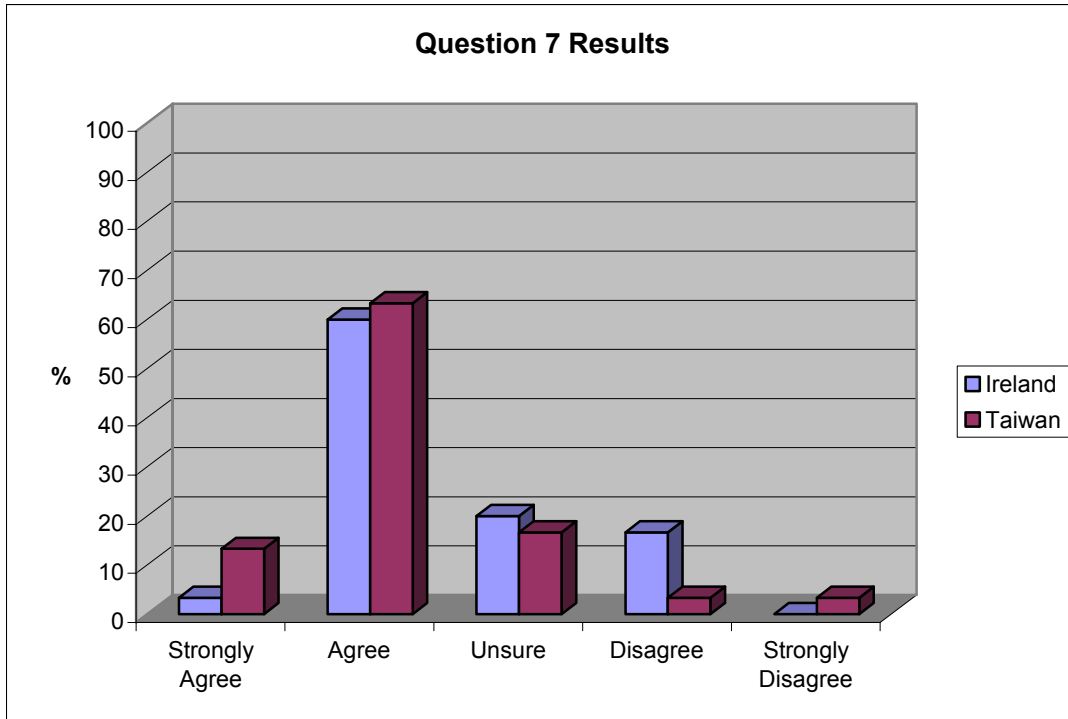


Figure 5-7 Belief that there are many entrepreneurial opportunities

Most of the respondents from both countries believe that there are many entrepreneurial opportunities in their societies, this is positive as there should be improvements in the amount of entrepreneurial activity in the future for both Taiwan and Ireland as my sample clearly highlighted opportunities can be recognised.

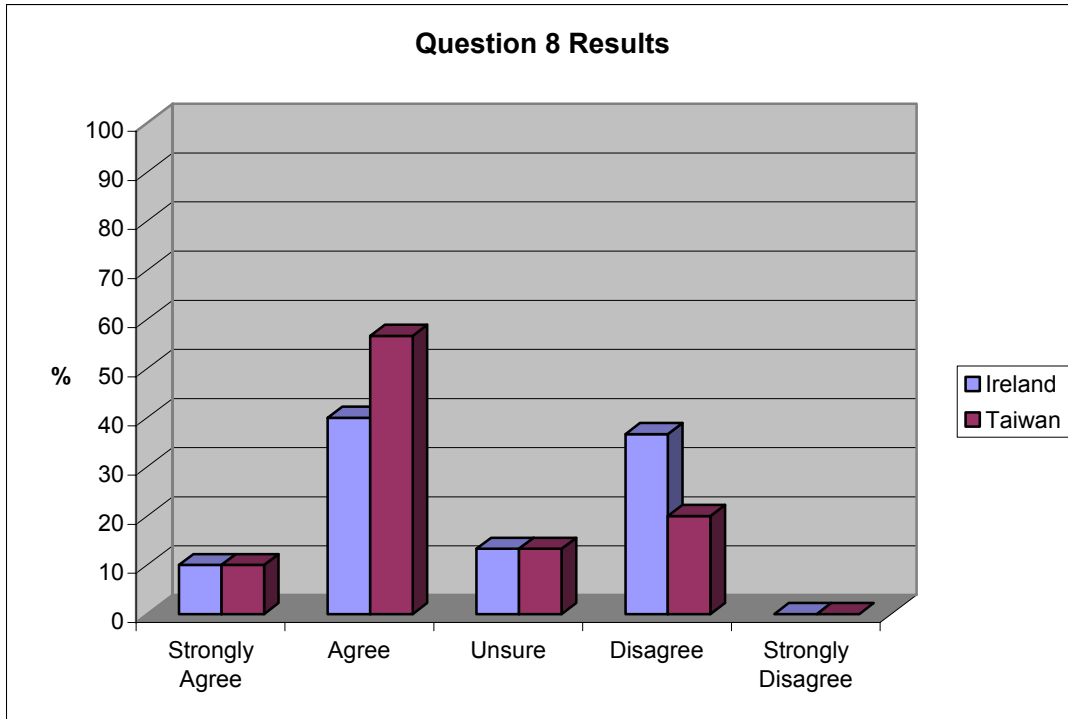


Figure 5-8 Belief that the media does a good job highlighting entrepreneurs

There were more Taiwan respondents that believed the media in their country did a good job in highlighting entrepreneurial successes. According to the survey Ireland also has high opinions of their own media, which shows that the media in both countries plays an essential part in encouraging entrepreneurship. There can always be more done by the media such as illustrating the achievements and highlighting economic benefits of entrepreneurs. If the media can build positive interest and goodwill towards entrepreneurs by improving the recognition of entrepreneurship as a career choice it will benefit the overall success of the country.

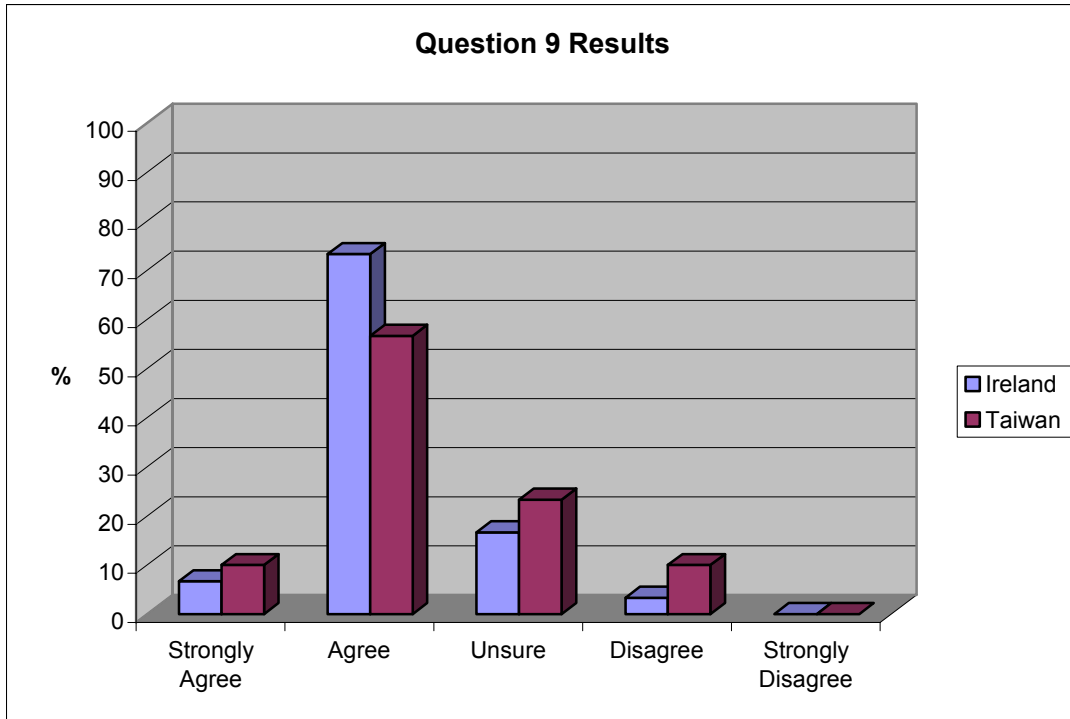


Figure 5-9 Are or personally know entrepreneurs in their society

This result showed that (80%) of Irish people knew someone that was an entrepreneur or was an entrepreneur themselves. Taiwan's result was also quite high with (66%) of people directly knowing an entrepreneur. This goes to show that there is a high concentration of entrepreneurs in both countries with the majority of people personally seeing and being touched by the results of entrepreneurship.

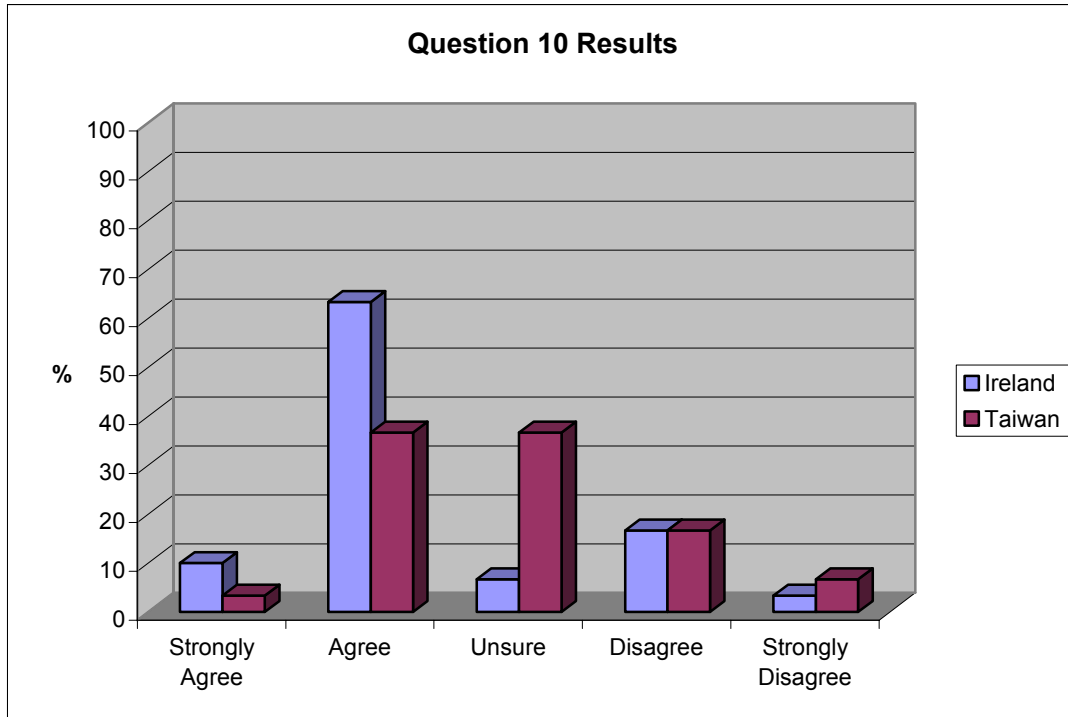



Figure 5-10 Would consider becoming an entrepreneur

This result showed that the majority of Irish people (73%) given the opportunity would consider becoming an entrepreneur. A huge number of Taiwanese people (33%) answered unsure to this question which could be attributed to a cultural difference, while (39%) of people admitted they would consider it if the opportunity arose.

6 Conclusions and Recommendations

What is clear after completing the study is that entrepreneurship is a combination of personal, societal, business and environmental factors that all work together in encouraging innovation and entrepreneurship in a society. There is no question that personal driving forces are extremely important in bringing out ambition and an entrepreneurial spirit but external factors are also extremely important such as public policy, access to finance or advice, education and ability to exploit an opportunity. Regardless of nationality there are some common personality traits of entrepreneurs such as a need to achieve, driven by an idea, a willingness to exploit a challenge, to persevere, to work hard, a high level of self belief and the ability to work with or delegate to others. To encourage and inspire entrepreneurial behavior it is important that entrepreneurial characteristics are nurtured and developed within the educational system and are valued within the wider culture and society while ensuring that an environment exists to further encourage entrepreneurship.



Ireland has seen an increase in economic growth over the last few years and this has created many new opportunities and different avenues for people to pursue. Despite these new opportunities many Irish people are still afraid to leave their job and set up business on their own. This is mostly because the fear of failure stops them from leaving a safe work environment to one that is more uncertain. This could be helped if entrepreneurship was more diffused into the education system, although there is plenty of initiatives and competitions in the education system, entrepreneurial education is perhaps still a little low. Some aspiring entrepreneurs may need to be coached about the barriers that exist and how they might overcome the issues. Usually among successful entrepreneurs there is a characteristic of perseverance that even if they experience failure first time they are more likely to try again until they succeed. Among entrepreneurs, experiencing failure is usually seen as learning from your mistakes but if the Irish are more risk averse this hinders the level of entrepreneurship in society. This is evident as Ireland has high levels of entrepreneurship in comparison to many EU countries, but it trails many countries outside the EU, including US, Canada, Iceland, New Zealand and

Australia. There has been an increase in government policies and awareness to improve entrepreneurial education recently but there is still more work to do to utilize the full capacity of the Irish entrepreneurial market. Finance which is one of the key issues for new business owners needs to be made more available and more women need to be encouraged to participate in the Entrepreneurial market. The transfer of research, technological development and innovation from universities to business needs to be addressed and the process made smoother.

Other techniques that could be used to promote entrepreneurship in Ireland could be to encourage development agencies and small business representative bodies to promote the achievement of entrepreneurs more by illustrating the achievements, highlighting the economic benefits and illustrating the risks that have been overcome by successful entrepreneurs. By building a positive media interest and goodwill towards entrepreneurs and improving the recognition of entrepreneurship as a career choice it will facilitate the acceptance and encourage more entrepreneurialism. Another method of encouraging entrepreneurship in other disciplines besides the area of business would be to offer modules at third level education in all fields of study so that a more evenly educated group of entrepreneurs could be encouraged. To facilitate the commercialization of new ideas, solid links need to be developed and maintained between researchers and entrepreneurs who have the skills and motivation to bring about fruition of the innovation.

Ireland's entrepreneurs often start small and remain small this can be for many reasons but the internationalization of any new company should be more of a priority at the early stages rather than becoming resigned to the fact that the company is small and will probably stay that way. Often in Ireland the financing at the early stages of setting up a business can be difficult as the availability of finance, informal investment or equity and debt finance, might not be as readily available as in some other economies.

Cluster development is important and Ireland needs to create more clusters. If there were more clusters this would allow SMEs to use the cluster and networks to gain advantage in

the world markets. Business owners need to be educated on the advantages of being part of a network. Maybe by providing a network resource center, businesses can have a way to facilitate connections. Collaboration between networks and clusters is important so as to improve the innovative framework that already exists.

Taiwan's economic performance has been very strong recently and the increase in GDP directly results in a higher rate of new start-up companies. Technology is considered to be one of the most important factors in raising Taiwan's industrial competitiveness and they have increasingly invested in R&D, which results in the country being able to introduce new technologies faster than their competitors.

Taiwan's entrepreneurial culture is based on the utilization of increasingly more advanced technologies as well as the intensive use of physical and human capital. Taiwan's enterprises have become efficient at producing a great deal of goods that they had no experience in at all a few years ago. Taiwan's industrial base is very heavily dominated by small companies which can be incapable of achieving rapid innovation on their own. This leaves the state the responsibility of investing in national projects to help reduce the dependence of small firms on imported technology.

The structural change in the economy over the last few years has given rise to massive changes in Taiwan and increased levels of innovation. This occurred when the IT industry grew with remarkable speed as compared to other industries from 1991 to 2000 and there was a decline in the manufacture of traditional products while electrical and electronic products for national export increased, resulting in increased levels of GDP. More recently the globalization and the accession to the WTO offered new opportunities for the development of entrepreneurship. Today entrepreneurs can enjoy a sound regulation system, better financial support and a more open market economy. But there are still challenges as there are a massive number of global rivals emerging from developing countries and there are rising costs of labor, land and environmental protection.

Appendix 1

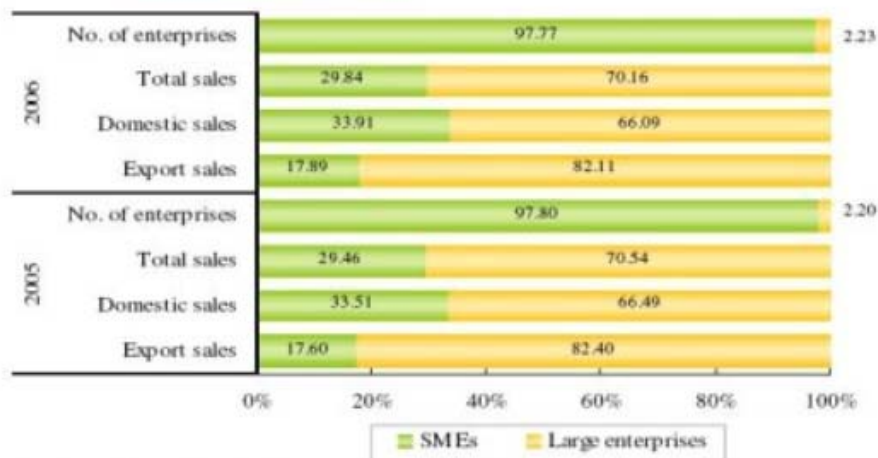
Enterprise Performance in 2006 – by Size

Units: enterprises; NT\$ millions;

Indicator	All Enterprises	SMEs	Large Enterprises
No. of enterprises	1,272,508	1,244,099	28,409
Share	100.00	97.77	2.23
Annual growth rate	1.50	1.47	2.93
Total sales value	34,326,070	10,241,215	24,084,855
Share	100.00	29.84	70.16
Annual growth rate	1.13	2.41	0.60
Domestic sales value	25,594,318	8,678,992	16,915,326
Share	100.00	33.91	66.09
Annual growth rate	1.12	2.33	0.51
Export sales value	8,731,753	1,562,224	7,169,529
Share	100.00	17.89	82.11
Annual growth rate	1.17	2.86	0.81

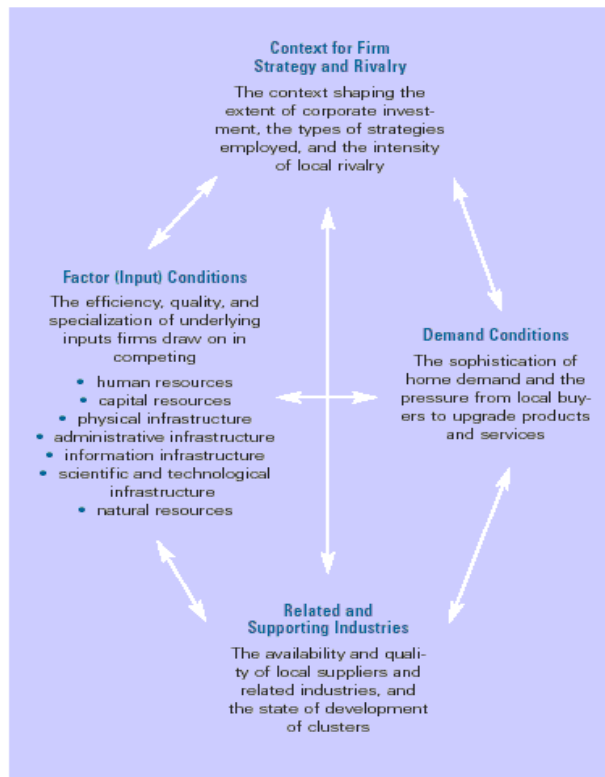
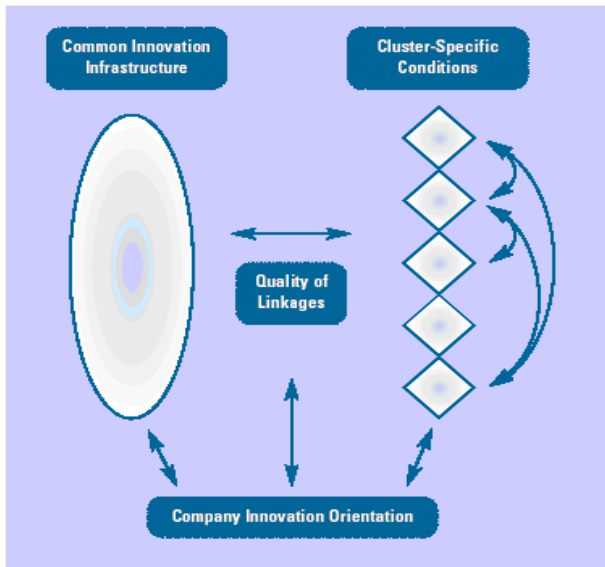
Source: Ministry of Finance, Tax Data Center, VAT data for 2006.

The Shares of Key Performance Indicators Held by SMEs and Large Enterprises, 2005 – 2006

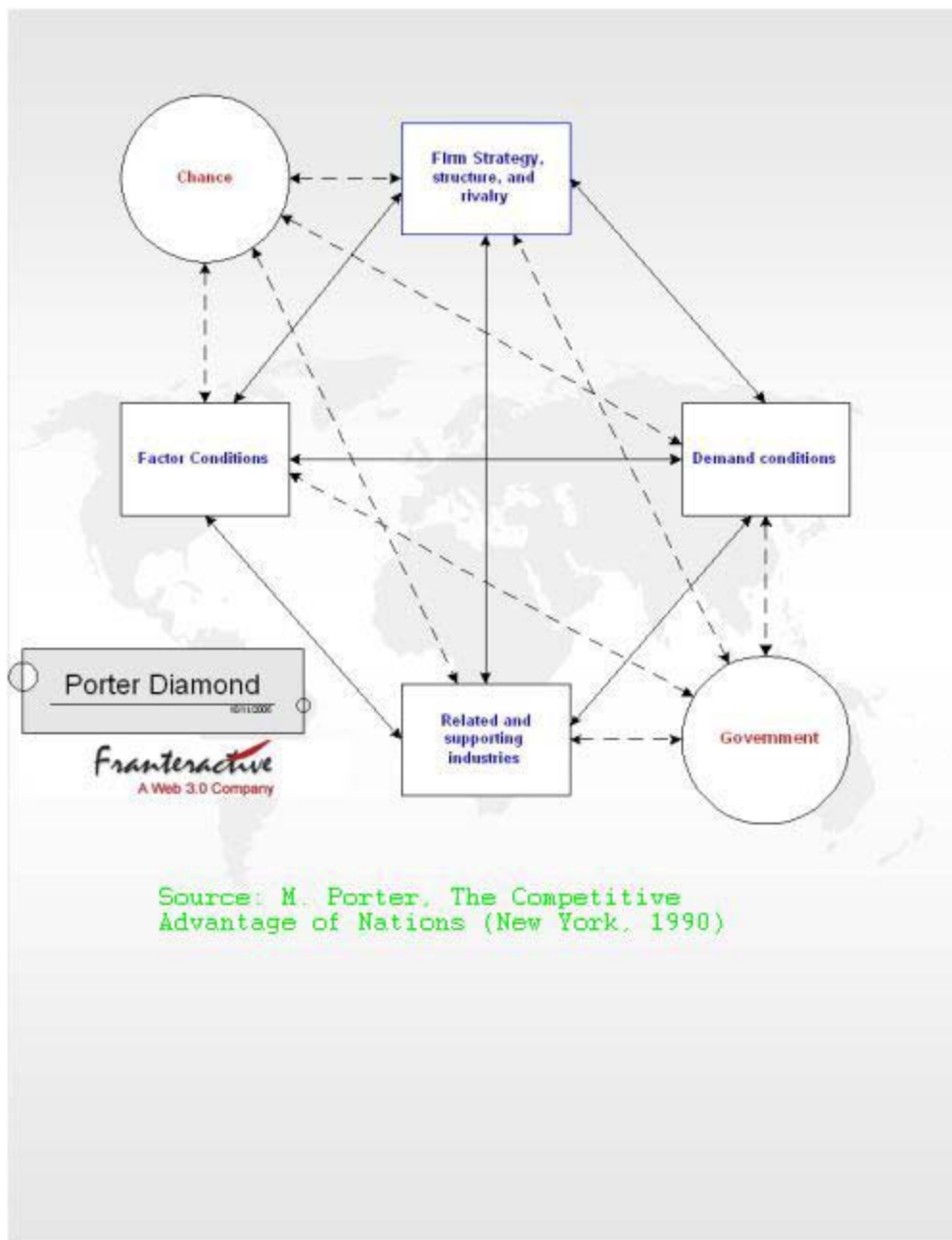


Source: Ministry of Finance, Tax Data Center, VAT data for 2005 and 2006.

Appendix 2



Formulating Porter's Diamond



Appendix 4

1. Please select your nationality and answer the questions below related to your own country only:

Irish:

Taiwanese:

2. Please enter your basic data for statistical purposes only:

Male/Female.	
Occupation.	
Firm / business type.	
Highest level of education obtained.	
Age.	

3. Please select the level to which you agree or disagree:

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1) My country is innovative.					
2) There are lots of entrepreneurs in my country.					
3) Entrepreneurship is a good career choice.					
4) I feel that I have the necessary skills to become an entrepreneur.					
5) There is a stigma attached to entrepreneurs whom fail.					
6) The government does enough to support entrepreneurs. i.e. finance, grants, policies, laws etc					
7) There are many entrepreneurial opportunities in my country.					
8) The media does a good job highlighting the entrepreneurs in our society.					
9) I am or personally know entrepreneurs in my society.					
10) I would consider becoming an entrepreneur.					



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