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Ireland's progression towards a Knowledge Economy

An investigation into the perceptions of Research & Development Managers with-in established Multi-National Companies (MNCs), as to the reason that MNCs invest in Research & Development activities in Ireland.

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September 2007

A Research Dissertation submitted in partial fulfillment for the Degree of Masters of Science in Technology Management of the National University of Ireland Galway.

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I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Master of Science in Technology Management is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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ABSTRACT

Globalisation has made the world a very small place. Multi-National Companies (MNCs) seek to optimise their return on overseas investment by applying stringent techniques for assessing the suitability of new markets. The growth over the last decade in global foreign direct investment (FDI), points to an increasing need by MNCs to find appropriate overseas locations to serve fragmented local markets and to be closer to key customers. There is a belief that MNC's provide quality jobs, superior skills and technology and opportunities for local linkages and exports (Dunning, 1993, Young *et al.*, 1994a; Dicken, 1998).

In recent years, the Republic of Ireland has been haloed as a leading location for foreign direct investment. Neatly perched on the periphery of Europe, Ireland has in the last decade, outperformed many developed countries. More recent waves of investment are seen as being of higher quality in terms of affiliate autonomy and local sourcing (Amin *et al.*, 1994) and as a result, the extent to which inward investors become embedded in host countries takes on even greater significance (Phelps, 2000).

The scope of this research is to conduct an exploratory investigation into the factors that specifically influenced decisions by MNCs to invest in R & D facilities in Ireland.

The investigative methodologies employed saw the application of both primary and secondary research. An initial review of the relevant literature focused on FDI in the global and Irish contexts. Primary research, in the form of depth-interviews, was undertaken with existing MNCs in Ireland.

The results of the research indicate that whilst Ireland has been extremely successful in attracting manufacturing and service related activity, it has not done as well in securing large scale R&D investment. Equally, the

factors that conspired to attract existing R&D investment in Ireland do not follow the more traditional and expected investment requirements matrix as applied by MNCs in seeking new investment locations.

CHAPTER 1

INTRODUCTION

1.0 Introduction

1.1 *Subject Matter Introduction*

Geographical markets are converging, leading to the emergence of, what some have termed, “the global market” (Littler and Schlieper, 1995). The world is undergoing a new industrial revolution – “the knowledge revolution” – fuelled by the pace of technological change. The world according to Friedman (2005) is “flattening”, as we enter the “participation age” where more and more people join and use the commercial and information networks created by technology. R&D is at the heart of scientific and technological progress and to increasing productivity, exploiting growth opportunities in emerging markets, and creating knowledge-driven competitive advantage.

True globalisation and the advances in e-commerce have transformed the competitive landscape for FDI. As Ohmae (1985) comments, “information has made us all global citizens”. Porter’s theory (1990) contends that nations compete with other nations and strive to devise sources of competitive advantage. This underlines the importance for countries to professionally and strategically manage their individual country brand for the purposes of attracting FDI. Kotler et al (1999) refers to this as “Strategic Image Management” – the notion of researching a place’s image among its audiences, segmenting and targeting its specific image and its demographic audiences, positioning the place’s benefits to support an existing image or to create a new image.

Kuehn (1999) notes that in no other European Union Country have lifestyles changed as much in the last twenty years as they have in Ireland. Economics have played a strong part in changing the fabric of Ireland. In 1988, *The Economist*, published a European survey and labelled Ireland “The Poorest Of The Rich” and concluded that the country was heading

for catastrophe, mainly because it had tried to erect a welfare state on continental European lines in an economy that was too poor to support one. Yet by 1997, Ireland featured on The Economist's front cover as "Europe's Shining Light". This remarkable transformation of Ireland from traditional low-cost manufacturing into a 'knowledge-based economy' has enabled Ireland to attract and retain foreign direct investment (FDI) at a time when there is increased global emphasis on lowering costs and delivering strong product pipelines.

Enter the era of the "Celtic Tiger", (Sweeney, 1998, Grey, 1997), a moniker for Ireland during its exponential period of growth between the 1990's and 2001, during which time output growth averaged 10% per annum.

During these years, Ireland was transformed from one of the poorest countries in Western Europe to one of the wealthiest, bringing the ranking of Ireland to fifth in the World Competitiveness Table (OECD, 1999). Unemployment fell from 18% in the 1980's to 4.9% by 2000, industrial wages grew and public debt was dramatically cut with huge investments in education, public infrastructure and healthcare and an increase in FDI of over 40% (www.ida.ie)

The unprecedented growth enjoyed by Ireland during the formative Celtic Tiger era was principally spawned as a result of extremely high levels of FDI that contributed to the spectacularly high levels of GDP for the same period. It is not disputed that Ireland has been a successful location for attracting FDI and this has attracted much comment both politically and economically. This thesis will look at the background to the success of Ireland as an investment location for FDI in the economic context. It will present several perspectives in this regard, in particular looking at the investment landscape for R&D activities and the reasons why MNCs have picked Ireland as a location for R&D investment.

This thesis will add to the body of research in a number of ways. Whilst much has been written on the nature of FDI and the success of Ireland in this regard, the literature review revealed that little has been written on the specifics behind the attraction of Ireland as an investment location for R&D activities.

1.2 Fundamental research objective

The research is exploratory in nature.

1.2.1 *Research Aim*

This research aims to provide an exploratory review of the investment climate for FDI by MNCs in the Republic of Ireland. The research in particular aims to provide an economic context for the development of Ireland as a successful location for investment in Research & Development activities by MNCs.

1.2.2 *Research Objectives*

- 1) To investigate the perceptions of R&D Managers as to the key factors influencing decisions by Multi-National Companies to establish Research & Development facility in Ireland
- 2) To explore the current investment landscape in Ireland for R&D activities
- 3) To assess the importance of the pre-existence of a manufacturing facility in securing an R&D related activity.

1.3 Author's Reasons For Choice of Subject

The author is an employee of IDA Ireland, the Government agency tasked with attracting FDI to Ireland. Established in 1970, the agency has legislative powers under the Industrial Development Acts 1986-2003 to offer grant aid to companies seeking to invest in Ireland, subject to the fulfilment of certain terms and conditions. The author is employed as a Project Executive in the Medical Technologies Division of IDA Ireland and is tasked with attracting both new overseas companies to invest in Ireland and also with encouraging existing operations in Ireland to expand and develop their corporate mandates. As a result of the nature of the role, the author had access to a number of MNCs with existing operations in Ireland, some of which already have established R&D facilities. In addition and for the purposes of the research, the role allowed for the creation of ready access to a number of key personnel in academic institutions and policy-making organisations.

The topic of R&D is of interest to the author as it is of much current debate in Ireland as the country evolves towards a more knowledge-based economy, which increasingly has had to acknowledge threats in the competitive global investment economy. The traditional employment landscape is moving from a largely low-skilled manufacturing base to a more highly-skilled base seeking more highly educated graduates, especially graduates in the core sciences. The author feels that with the stipulations of the Lisbon Agenda, calling for increased investment in R&D and the correspondent creation of higher-skilled employees to more effectively meet the needs of the knowledge economy, it is likely that innovation will both underpin and drive required future growth and prosperity in both Europe and Ireland.

1.4 Dissertation Overview

This dissertation is presented under the principle headings of Introduction, Defining An Investment Landscape (Literature Review), Research

Methodology, Presentation & Analysis of Results, Methodological Critique, Conclusions & Recommendations, Appendices and Bibliography.

1.4.1 *Introduction*

Chapter one provides a comprehensive overview of the key topics as they are addressed in this thesis, as well as a summary of the research objectives and the author's interest in the topic under review.

1.4.2 *Defining An Investment Landscape*

Chapter two looks at the literature as it relates to the nature of foreign direct investment from a global perspective. Literature reviewed includes economic, corporate strategy, marketing, international business organisation, industrial relations, business management and technological innovation theories. The review examines the specific development of FDI in the Irish context, in the first instance, examining the key factors contributing to the presence of a substantial number of MNCs in Ireland and the attractiveness of Ireland as an investment location. The economic historical development of Ireland is also considered. More specifically then in the second instance, the literature review examines the nature of investment decisions by MNCs in R&D activities, making use of use of several analytical frameworks in the process.

1.4.3 *Research Methodology*

Chapter three examines the research methodology and research methods used, in particular as they relate to the epistemological underpinnings of the research approach.

1.4.4 *Presentation & Analysis of Results*

Chapter four sets out the principal findings from the primary research activities and examines them in the light of the original research aims and the core themes from the literature review.

1.4.5 *Methodological Critique*

Chapter five provides a critical analysis of the research methods as applied to the data collection procedures.

1.4.6 *Conclusions & Recommendations*

Chapter six provides a summary of the conclusions arising from the primary research and the literature review. Based on the findings of the author, a number of recommendations for future research are suggested.

1.4.7 *Appendices*

Information which was deemed to be pertinent to the purposes of the research but not for inclusion in the main text, has been incorporated as an Appendix (see Appendices Listing).

1.4.8 *Bibliography*

The bibliography provides a comprehensive list of all journal articles, books, conference papers, websites and other contemporary sources of information which were referred to in the course of the research project.

1.5 Development of the Irish Economic Model

Ireland is a small open economy, highly integrated into the world economy through both trade and investment links. As such, economic conditions are significantly influenced by the global economic environment. In the face of a global downturn in recent years however, the economy has proved highly resilient. The record growth experience of the 1990's culminated in the period 1997-2000 when the economy averaged growth

of over 10% annually. With the international downturn of 2001, slowdown was inevitable. In Ireland's case, it was relatively benign with the economy slowing to a still enviable rate of 5% annually (Economic Profile, Ireland, Enterprise Ireland, 2004). The Irish economy is still growing at a faster rate than most of its EU neighbours. Spectacular growth in the Irish economy is reflected in the increase in national GDP, which in 2006 reached €176.4 billion. On a per capita basis, this is equivalent to €33,277 per person, which is a 221% increase from the 1990's figures. Economic achievements over the past ten years included a doubling of national income, a reduction in employment by two-thirds, and an increase in the number of people at work by half. Ireland has consistently topped the 30 member OECD economic growth tables, often by a substantial margin.

Speaking at the launch of the 2006 IDA Ireland Annual Report, in June 2007 Chairman John Dunne said "Foreign direct investment (FDI) continues to contribute strongly to the Irish economy and to growth, but in a broader way than before" and he continued to outline that Ireland is now a global competitor for R&D investments from multinational companies and this investment has grown to record levels, which has been achieved in an environment of intense globalisation and increased competition. Mr Dunne said "Ireland is reaping the results of a concerted effort in Government policy to build a substantial foundation of world class science and technology in our academic institutions and with a strong emphasis on business and academic collaborations."

The economic success story of Ireland is well documented and Ireland is rated in the world across a range of indicators including;

- First position for Encouragement of Business Developed (*IMD, World Competitiveness Yearbook, 2007*)
- Second for corporate tax on profit (*IMD, World Competitiveness Yearbook, 2007*)

- Second for Flexibility and Adaptability of people (*IMD, World Competitiveness Yearbook, 2007*)
- Second for Well Educated and Skilled people (*IMD, World Competitiveness Yearbook, 2007*)
- Second for attractiveness of Investment Incentives (*IMD, World Competitiveness Yearbook, 2007*)
- Ranked in Top 15 R&D Collaborations (*IMD, World Competitiveness Yearbook, 2006*)
- First for quality of life (*Economist Intelligence Unit, 2005*)
- Most Globalised Country For Three Consecutive Years (*AT Kearney Globalization Index, 2004*)
- First in creativity (*Richard Florida, 2004*)

A key driver in the transformation of the economy has been the success in attracting overseas investment by MNCs, particularly companies headquarters in the US. Successive lucrative investment initiatives by these MNCs since the 1970's helped catapult the Irish economy from one of relative stagnation to one of advanced prosperity in a relatively short period. UNCTAD (1999) data for Ireland show that inward investment has not followed the global (and regional) pattern in recent years, as the country continues to attract high levels of FDI. Ireland's share of global and EU FDI has sharply increased as a result. From just under four percent of the total in 2000, Ireland accounted for more than one twelfth of total inflows to the EU-15 in 2003. On a global basis, the rate was similar, to reach almost five percent of total world inflows. In terms of stocks of FDI, UNCTAD records a figure for Ireland equivalent to 127 percent of GDP in 2003 - \$193bn. In absolute terms, this is the sixth highest level among the EU-15 and by far the largest in per capita terms. AT Kearney in a 2003 report, ranked Ireland as having the most globalised economy of 62 countries studied, as measured by openness to trade and investment, credit worthiness, and the importance of tourism. The report also referred to Ireland's winning combination of stable, competitive wage rates, low tariffs and a business friendly regulatory environment.

A critical review of the principal economic developments in Ireland in the last few decades, allows the opportunity to assess the factors that conspired to contribute to the economic turnaround of the country and to the creation of an investment-friendly landscape.

Ireland was one of Europe's poorest countries for more than two centuries (Powell, 2003). During the 1990's, Ireland achieved a remarkable rate of economic growth. By the end of the decade, its GDP per capita stood at \$25,500 (in terms of purchasing power parity), higher than both the United Kingdom at \$22,300, and Germany at \$23,500 (Economist Intelligence Unit, 2000). In 1987, Ireland's GDP per capita was only 63 percent of the United Kingdom's (The Economist, 1997). Most commentators acknowledge that almost all of the economic catch-up occurred in a little over a decade.

In contrast, an overview of the performance of the Irish economy in previous decades reveals a less-impressive performance – “dismal” in effect is how Powell (2003) described it. During the 1950's, the policy stance of successive governments was that of protectionism. Exports as a proportion of GDP were only 32 percent, with more than 75 percent of those exports going to the United Kingdom (Considine and O'Leary, 1999). In the 1950's, average growth rates were only 2 percent, far below the postwar European average (EIU 2000:5). The bleak economic landscape was reflected in massive emigration that effectively reduced Ireland's population by one-seventh in the 1950's (Jacobsen 1994:68). Subsequently, the Irish government slowly shifted away from highly protectionist policies in the 1960's and began to pursue a strategy of export-led growth. Progressive annual 10 percent reductions in Irish tariffs, were particular beneficial policies that helped to make Ireland more attractive to foreign investors (Jacobsen 1994:81). Ireland however, during this time made no progress converging to the rest of Europe's standard of living.

A significant advance in the economic development of Ireland occurred in 1973 with admission to the European Economic Community. Commentators have noted however that the intervening years from 1973-1986 were influenced largely by the implementation of Keynesian policies that led to fiscal crisis. During the oil shocks (1973 & 1979), economic policy saw governments attempt to boost aggregate demand through increased expenditure. In fact all government spending (from public infrastructure to implementing national pay agreements) increased between 1977 and 1981 (Honohan 1997). The reaction of the government was to increase taxes on labour and consumption in order to try to reduce the budget deficit. By 1986, the level of accumulated debt was 116 percent of GDP. Historian Joe Lee in his analysis of Ireland 1912-1985, described the Irish psyche, culture and economic behaviour as characterized by a “possessor ethic” rather than a “performer ethic”. There was, as O’Higgins (2002), notes a flight of capital as well as an exodus of people from the country, a situation chronicled by Fintan O’Toole and summed up in the title of his book; *Black Hole, Green Card: The Disappearance of Ireland*. High levels of debt, interest payments and expenditures put the Irish government in a very precarious fiscal position. Economic growth during the same period was very low. Ireland averaged 1.9 percent expansion of GDP per year between 1973 and 1986. Although this growth rate was the same as during the 1950’s, the difference was that the rest of Europe also grew slowly. There was only one sector of the Irish economy that did relatively well during the 1973-1986 period. With Ireland’s increasing openness to trade, foreign-owned entities continued to expand, increasing their overall employment by 25 percent (Considine and O’Leary 1999:119). The sheer necessity of economic survival (Jacobsen 1994) prompted agreed action to take corrective steps – the alternative prospect realistically being the intervention of the International Monetary Fund or the EU itself (Haughey, 1987). With runaway inflation and the failure of reduced taxation cuts to produce any marked response, the only option left was to drastically cut expenditure. As a result in the 1987 budget, current spending was reduced by 3 percent and capital spending cut by 16 percent (The Economist, 1988). In effect, these measures managed to get Ireland

out of its spiralling fiscal crisis. A more stable macro-economic environment emerged and the free trade policies that had actually existed for decades prior were allowed to operate unencumbered by the exigencies of government fiscal restraints. Equally, when Ireland signed up to the Maastricht treaty in 1992, this helped to make the commitment by Government to sound fiscal policies more credible and permanent (the treaty required members to maintain fiscal deficits between 3 percent of GDP). By 1989, Ireland's economy began growing at a rate of 4 percent (Jacobsen 1994: 181).

This continued growth of the Irish economy is evident by the key statistics for 2006 which includes GDP at €176.4 Billion, exports of €91.3 Billion and a reduction in total debt GDP to 22.8%. (See appendix 1 for summary chart)

1.6 The Research & Development Landscape

“Sustained investment in R&D is an essential foundation of the enterprise base and in developing Ireland as a knowledge-based society and as a basis for creating knowledge-driven competitive advantage across all sectors of the economy” – Report To The Inter Departmental Committee On Science, Technology & Innovation, July 2004

In order to assess the current investment landscape in Ireland for R&D and to address the research question, it is important to outline the current political and economic contexts by way of background.

The EU is currently behind the US and Japan in research and innovation performance. Gross expenditure as a percentage of GDP in Japan is 3.1%, US 2.7% and in the EU 1.77%, while the OECD average is 2.3%. In order to catch up with competitor regions, EU Heads of State in 2002 agreed a target for the EU to increase its R&D performance to 3% of GDP by 2010, with two-thirds of the increase to come from business.

Ireland is currently below the EU average at 1.56%. Significant steps have been taken towards increasing the quality and the quantity of R&D over the last decade. R&D in the business, higher education and public research institutions increased threefold during the 1990's, reaching €1.3 billion in 2001. Business R&D grew at an annual average of 15% over the period 1993-1999, although this was from a very low base. Foreign-owned MNCs spent almost €600m on in-house R&D in 2001 and this maintains a pattern that has held steady since the early 1990's, with MNCs accounting for two-thirds of business expenditure on R&D in Ireland. In total, there are almost 300 MNCs active in R&D in Ireland, corresponding to just under 30% of the total multinational base in the country. In 2006, the number of IDA client companies with significant corporate R&D mandates was 168, with more than 212 companies investing more than €250,000 per annum on R&D activities (IDA Annual Report, 2006). For the same period, IDA Ireland supported 54 R&D projects for MNCs and 5 collaborative R&D projects between Industry –Academia.

Almost fifty percent of these MNC R&D performers spent in excess of €0.5 million on in-house R&D during 2005 in Ireland. This includes 37 companies with an R&D expenditure in excess of €5 million per annum, which represents a 100% increase in the corresponding figure for 2004. These 37 companies account for almost 80% of the total multinational R&D activity in Ireland (source: Forfas ABSEI survey). To comply with the Lisbon agenda, business investment in R&D must increase to a target of 1.7% of GDP by 2010. The level of Government investment in research and technological development and innovation has increased from €0.5 billion in the period 1994-1999 to €2.5 billion over the period of the National Development Plan (2000-2006) with a further commitment of €6.1 billion for Science, Technology & Innovation under the National Development Plan 2007-2013.

Ireland is a leading exporter of high technology products. The overall success of Ireland in attracting innovative and technology driven industry

is evident by the following indicators; €73 billion annual exports, provides direct employment to 135,487, and is the location of choice for many of the worlds leading companies across a diverse sector range such as Pharmaceutical, ICT, Medical Technologies and Financial Services.

Ireland's innovation landscape has evolved and thrived through a team approach of government, respective agencies, academia and industry which has resulted in a high level of connectivity which has spear headed Ireland to become a global centre for innovation based R&D and into a leading position with respect to supporting innovation networks between nations and industry as recorded by Forrester Research Inc 2006 (see appendix 2). The Forrester Wave™: National Innovation Networks, Q4 2006 identified Ireland as holding a lead position in what is called the "Transformer" role. Transformers are described as locations which attract inventive firms from other countries looking for production or other market opportunities.

This thesis will look at the factors that influence these MNCs, operating across the technology sectors of Pharmaceutical, ICT, Engineering and Medical Technologies, in establishing R&D facilities in Ireland.

CHAPTER 2

DEFINING AN INVESTMENT LANDSCAPE

2.0 Defining An Investment Landscape

“One of the main reasons Intel Ireland has been so successful is that we have an excellent employee base, our employees have consistently proven their ability to master the engineering, scientific and manufacturing disciplines involved in the world’s most advanced technologies”

- Jim O’Hara, Vice President, Intel Ireland

“Today’s announcement highlights Ireland’s role as an important location to help fulfill our global research, development and business strategy. As a globally integrated company, we are committed to drawing on locally established skills and talent to create value for clients worldwide.”

- Michael Daly, Country Manager, IBM Ireland

This literature review will critically assess the factors that conspired to make Ireland an attractive location for MNCs, and in particular will look at these factors as they relate to investment by MNCs in R&D activities. To assist this analysis, a number of conceptual framework models will be used to understand the nature of global FDI.

2.1 Conceptual Models of Foreign Direct Investment

A review of the literature indicates that many authors have written on this topic, and it would seem, there follows, an equally differing array of opinions and models for explaining the factors that drive FDI and the factors that conspired in the Irish context to encourage MNCs to invest in operations in the first place.

Whilst economic geographers continue studying the inherent territoriality and spatial structure of economic activity (White, 2003), contemporary research now places greater emphasis on social, political, cultural and institutional factors (Dickens, 2000). It is generally agreed that increased knowledge of a foreign country reduces both the cost and uncertainty of

operating in a foreign market (Buckley & Casson, 1985). Related to knowledge is experience, which is thought to provide important tangible and intangible advantages (Gresser & Gaskell, 1993). It is generally believed that a firm with greater experience of a particular location is more likely to invest than a firm with less experience (Kogut, 1997). This could go some way to explaining how MNCs in Ireland continue to invest in existing facilities by adding new corporate mandates over time, including investment in R&D facilities (e.g. Wyeth, Cisco, Medtronic, Intel, Boston Scientific, PepsiCo, Bausch & Lomb, Microsoft, GlaxoSmithKline, Alcatel, Bristol-Myers Squibb's). The size of the foreign market and its potential growth are regarded as key factors influencing choice of location (Kobrin, 1979; Yamawakai, 1993) as is access to a free-trade area (Billington, 1999). Economic factors, such as inflation and particularly tax structure of the host economy, are key investment considerations (Gilmore et al, 2003). Several studies have found that the rate of corporate taxation has a negative effect on investment decisions (Friedman et al., 1992; Loree and Guisinger, 1995). In Ireland, the low corporation tax rates in contrast, have proven to be a key driver for decision makers of MNCs in locating corporate functions in the country. There is some disagreement amongst researchers about the extent to which firms prefer to invest in markets exhibiting near and similar cultures. While some studies conclude that firms will successively enter markets at an increasingly cultural distance from the home country (Johnson and Vahlne, 1977), other studies have refuted this notion (Turnball, 1987; Renito and Gripsrud), 1992. IDA Ireland literature evidences the cultural similarities between the US and Ireland as an important factor for inward investors in terms of easy adaptation to Irish work, human resources and social practices.

The availability of resources, in particular labour and raw materials are widely acknowledged as influencing a firms FDI decisions (Moxon, 1975), although the global sourcing of raw materials has reduced the significance of this dimension. Other factors which have generated comment include the political stability in a host country, or the risk that a host government will unexpectedly change the "rules of the game" within which businesses

operate (Butler & Joaquin, 1998) and the quality of life which is regarded as an increasingly important incentive in attracting foreign investors by encouraging senior personnel to locate in a region (Christodoulou, 1996). Ireland was recently nominated by the Economist Intelligence Unit as the country offering the best quality of life in the world, across a number of performance indicators (schools, housing, work-life balance etc). The soft factors such as quality of life, could be seen as significant for those senior personnel from the parent entity, who often are required to move with their families to Ireland to oversee the first few years of the new Irish operation. In fact, quality of life issues can influence significantly the attraction of knowledge-workers in high tech activities and advanced services (Sassen, 1991; Mugerauer, 2000, Yeung *et al.*, 2001).

2.2 Traditional Landscape for Foreign Direct Investment

It is a recognised fact that the varying levels of success of innovation is heavily dependent on respective national conditions which can either stimulate, facilitate or hinder its progress and acceptance into both business and social communities. This view is as supported by both List (1841) and Lundvall (1992).

This interest in the relationship between firms and states has generated a substantial stream of international business literature (Vachani, 1995). The internal dynamics and competitive processes influencing the development of MNCs and their affiliates have equally drawn much attention from researchers (Birkinshaw, 1998; Delany, 1998). To attract FDI, it is important that Governments understand the reasons why firms invest abroad. Anand and Kogut (1997) believe that there are two main reasons; sourcing competitive resources and response to competitive pressures in oligopolistic industries. International management literature points out that international strategies are based on the interplay between a firm's competitive advantage and the comparative advantage of the country in which its value chain activities are performed (Kogut, 1985;1986). The competitive advantage of a nation then is rooted in the resources that the

country can offer to perform specific value-chain activities (Porter, 1990). Calliano notes that countries' resources are not only related to wages and material costs, but also related, particularly in advanced countries, to knowledge. "This knowledge is partly embodied in the skills of the workers, and partly captured through spillovers due to proximity to research centres, suppliers or customers" – Anand and Kogut, 1997. Through FDI, the investing firm can not only penetrate the domestic market, but can also gain access to raw materials, diversify its business activities and rationalise production processes. Gilmore et al (2003) note that investment overcomes some of the traditional drawbacks associated with exporting such as trade barriers and transport costs. It is thought that a large proportion of overseas investment is motivated by defensive tactics (Dunning, 1971), specifically as a reaction to problems in the home country (Watters, 1995) and markets reaching saturation. Increasing technological intensity within the firm's industry is also thought to encourage FDI (Clegg, 1998). This is of particular relevance to our research question when we look to define the reasons why MNCs chose Ireland as a location for knowledge-driven investment in R&D activities.

While the relationship between FDI and growth has been intensely debated, the precise nature of the relationship, the preconditions required to promote growth and the mechanisms through which it promotes growth remain less documented. Recent developments in growth theory provide a convenient framework within which to analyse the relationship between FDI and growth in Ireland. New growth theory emphasises those factors which are supposed to characterize FDI (technology transfer, skills development, sophisticated labour etc). V.N. Balasubramanyam et al (1999) propose four hypotheses for this to occur;

Hypothesis 1

FDI can promote growth in the presence of a liberal trade regime. In other words, FDI, economic growth and exports are intertwined

Hypothesis 2

FDI does not, in itself, transfer sufficient volumes of human capital but rather it augments existing human capital and that a threshold level of endowments of human capital is a necessary condition for the promotion of growth through FDI

Hypothesis 3

FDI has to be co-ordinated with investments in human capital. This can best occur in the presence of a domestic market.

Hypothesis 4

Technology and skill spill-overs from FDI do not materialise from the mere presence of FDI. These have to be engineered with effective policies. These include effective competition from locally owned firms through both investments in R&D and domestic production.

The hypothesis 4 model is of direct application to the Irish context and to the research question. The outline of economic developments provided earlier points to Government strategies that were designed specifically to attract inward investment and the creation of an export-friendly environment. The establishment of IDA Ireland for example by the Irish Government and their inherent mandate to provide grant-aid assistance for the R&D activities of MNCs could be considered as a direct example of effective policy engineering. Whilst a useful framework, it perhaps over relies on the presence of a domestic base as the engine for growth, whereas in the Irish context it was the presence of MNCs in the first place that drove local economies, infrastructure and hence increased investment in human capital.

2.3 The Nature of Foreign Direct Investment

Foreign Direct Investment (FDI) has been of interest to many economists since post-second world war period when European countries and Japan needed capital from the United States to finance reconstruction following

the damage caused by the war (Vu Le and Suruga 2005). FDI is considered by developed and developing countries as one of the most important channels through which countries may obtain resources for its development. Bora (2002) argues that FDI is essentially a “package of potentially wealth creating assets that can have a significant impact on home and host countries”.

Of course, there are two parties that partake in FDI, the host country and the receiving country. Wong and Adams (2002) argue that emerging market economies are interested in attracting FDI because it can facilitate the transfer of Intangible assets such as technology, skills and management know-how, thus helping to directly boost productivity and growth and thus may help secure foreign market access. Pfeffermann (2002) suggests the greatest advantage that FDI brings to the developing country is that it is less fickle than loan or stock purchases (“portfolio investment”) and unlike portfolio investors, direct investors do not pick up and run at the first sign of trouble. Critics of FDI, such as World Bank, UNCTAD and Joseph Stiglitz, argue that there is an unfair distribution of wealth, with certain countries continually receiving mobile FDI. Stiglitz (2002) argued that “despite the sizable increase in FDI to developing countries in the past decade, most of that investment goes to only a few countries. The majority of countries benefit only marginally...”

FDI has been described by Daniels and Radebaugh (1995) as “the highest commitment a domestic company can make in international business because it usually involves not only the infusion of capital, but also the transfer of personnel and technology”. It is traditionally regarded as a means of exploiting firm-specific assets in a foreign market (Hymer, 1960; Caves, 1971).

V.N. Balasubramanyam *et al* (1999) describe FDI as a composite bundle of capital, know-how and technology. In fact, the term “multi-national, is generally applied to those engaged in FDI whereby the multi-national company has a controlling interest in foreign companies. MNCs can exert

a huge political and economic influence. Their immense economic power is reflected in Anderson and Cavanagh's (1999) finding that the top 100 largest MNCs now control about 20 per cent of global foreign assets. FDI is however unevenly distributed geographically, with the world's top 30 home countries generating approximately 95 per cent of total FDI inflows, and the world's top 30 home countries generating approximately 99 per cent of outward FDI stocks (Gorringe, 1999). More specifically, US MNCs employ over 7 million people worldwide and approximately 2.5 million of them are in Europe (UNCTAD, 1996; Ferner and Quintanilla, 1998). MNCs then, as Gunnigle et al noted, have acted as key drivers in the increased internationalisation of business or as Ferner and Hyman (1998) indicated as the "dominant actors in the internationalisation process". Bhagwati (1978) proposes a hypothesis that given other factors, the efficiency of FDI in promoting growth is likely to be higher in countries pursuing an export promotion strategy than in countries pursuing an import substitution strategy. This too could be likened to the Irish case where export led strategies were introduced by successive Governments, which provided the institutional framework for encouraging FDI investment.

Ireland's growth and exporting performance during the 1990's is primarily attributable to its success in attracting FDI (Grimes, 2003). Amin and Tomaney (1998) note that in Ireland there are examples of plants occupying a relatively strategic position within the parent corporation. McAleese and Counahan (1979) in a study, characterised foreign firms operating in Ireland as "stickers" (primarily interested in building up a long-run business) rather than "snatchers" (concerned mainly with seizing a profit). The Economist (1997) found that almost a quarter of US manufacturing investment and some 14 percent of all FDI projects in Europe between 1980-1997 located in Ireland.. The attractiveness of Ireland for US investment has been largely explained by the fact that US companies in Ireland received a return on investment four times the EU average during the past ten years. Gunnigle et al (1998) comment that the US MNC is "particularly significant in the Irish context". While Ireland's

low rate of corporation tax at 12.5 percent, has been an important factor accounting for this high rate of return, it is generally agreed that a number of different factors working together helped to attract FDI to Ireland (Hannigan, 2000).

2.4 Ireland – Application of Models

Grimes (2003) notes that given its small size, its extreme openness to outside influences and its “inordinately high dependence on inward investment”, one must apply caution in applying many global FDI models to the Irish experience. Given the exploratory nature of this research, and the need to conduct a comprehensive literature review, models and comment will be critically assessed as they apply to the Irish context, given our research aim to explore the factors influencing the decisions by MNCs to invest in Ireland and more specifically, in R&D activities.

Dunning’s (2000; 1998) paradigm of foreign investment argues that the likelihood of a firm investing abroad, depends essentially on firm specific factors, location specific factors that make it advantageous to invest in a particular country, and internationalisation advantages which cause the internal transfer of labour, capital and technical knowledge within the firm to be more cost-effective than using outsiders, such as licensees, import agents and distributors. Dunning also noted that late twentieth century capitalism is knowledge-based, regional or global in its scope and involves more intra and inter-institutional alliances than any of its predecessors. Grimes (2003) notes that with advances in telecommunications and the lowering of barriers to trade, the locational options open to firms to engage in both asset-augmenting and asset-exploiting activities have widened considerably, while at the same time, the need of countries to attract knowledge-related assets to upgrade the competitiveness of their own firms is more acute. IDA Ireland for example actively encourages companies to “move up the value-chain” and “build a knowledge economy” by investing in higher value global and EMEA functions. While Dunning argues that the eclectic paradigm is sufficiently robust to

accommodate most of the changes which have characterised FDI in the 1990's, Grimes (2003) feels that there is a need to incorporate more recent changes in international business models in order to explain the rationale for investment strategies associated with the new technologies and exploiting relatively peripheral locations like Ireland. The acknowledgement by De La Torre and Moxon (2001), of the limited ability to date of international business theory to effectively integrate the technology revolution into their theoretical frameworks is indicative of the need Grimes feels for further research in this area. This is of particular relevance here as we specifically examine the investment landscape for the attraction of R&D investment Ireland.

Globalisation has widened the options open to MNCs to locate in different countries. Within countries there is a tendency for knowledge-intensive FDI (like R&D activities for example) to become more concentrated in sites which have clusters of firms engaged in synergistic activities (Kuemmarle, 1996). Thus MNCs exacerbate regional disparities by invariably locating in the major urban and core regions of the host countries (Porter, 1990). This would be particularly true of Ireland, where we see R&D investments largely concentrated in the Dublin capital and surrounding areas for the technology sector (although other sectors such as Medical Devices and Pharmaceuticals have a more regional spread of R&D investment (e.g. Galway, Cork). Bradley (2002), suggests that Porter's diamond-based framework of competitiveness provides some useful insights into explaining how a country like Ireland could implement a development strategy in a sequence of separate stages. The first phase then from the 1950's-1980's was factor driven, with an emphasis on low corporation tax, low wages and subsidized capital formation. The second stage from the 1980's to 2000 involved massive public investment in plant, infrastructure and human capital, which was co-funded through EU regional aid. Policy makers are now attempting to shift to the third stage Grimes indicates, which is driven by innovation and is associated with the Irish economy. As innovation is linked with the development of intellectual capital, this theory could be linked with the development of an

R&D base in Ireland. Porter's model has been criticised however as being inappropriate for small open economies like Ireland, since he insists that development is crucially dependent on the domestic market, and cannot simply be based on supply chain linkages to the global economy (Rugman and Verbeke, 1993). In the context of Ireland however, the evidence points to the fact that a thriving domestic economy developed as small, niche firms, particularly in the software sector, piggy-backed on the success and demand requirements of MNCs, creating a natural spill over effect that is contrary to Porter's model. Porter also ignores the evolution of MNCs from their earlier, centralized hierarchical structure to a more organic web of parent-subsidiary relationship, where initiatives come from the company's periphery, as well as from its core (Bradley, 2002).

In fact, the need to pay much more attention to the evolution of transnational subsidiaries has been highlighted in a number of recent studies (Birkinshaw and Hood, 1998; Hood and Young, 2000). Zanfei, (2000) suggests that as technical and market complexities increase, MNCs are being forced to tap into international networks, which enhances the abilities of decentralized subsidiaries to innovate. This would relate to decisions by MNCs to locate R&D centres in locations away from the parent company and we will assess how this relates to the MNC community in Ireland.

Gillespie et al (2000), refers to the greatly increased locational configurations which companies in the technology sector offer to corporate organisations resulting in enhanced locational flexibility in their strategies to manage territory and to serve markets. In their review of European case studies, they note that regions with the right attributes in terms of production costs – even where such regions were previously described as “peripheral” – have increasingly become incorporated into corporate structures of production. While agreeing that the Internet creates forces for agglomeration and deagglomeration, Leamer and Storper, 2001, conclude that overall it is not likely to have a dramatic effect on the geography of economic activity. They argue that spatial agglomeration has accompanied

the geographic fragmentation of certain parts of the production chain, particularly intellectual and immaterial activities, such as R&D, strategy, marketing, finance and legal work, all of which is growing in significance. Ireland has been particularly successful in exploiting the decentralization of economic activity, particularly from the US, although Grimes (2003) says that it would be far-fetched to say that Ireland has come close to becoming an “innovative milieu”. This is quite a critical view of the development of an FDI base in Ireland and is contrary to the view of other authors who believe that it was the development of an innovative framework, largely driven by Government policies which helped spawn successive FDI investments.

Ireland has benefited from many of the shifts towards a global economy, and in particular from the restructuring of operations controlled by MNCs (Brethnach, 2000). Grimes argues that the high levels of profitability of foreign firms in Ireland has been attributed to both domestic wage restraint and low corporation tax, although the most important proximate cause has been an extremely high level of productivity (O’Sullivan, 2000). Gunnigle *et al* (1998) note that the attraction of FDI represents a key plank of Irish industrial policy where inward investing firms are offered an attractive package of financial incentives and a range of other attractions such as its young workforce and a comparatively unregulated industrial relations environment.

2.5 Factors Influencing Trends in Foreign Direct Investment

The study of national systems of innovation dates back to the work of Friedrich List who in 1841 published *The National System of Political Economy*. This early work of List highlighted a number of key points including:

- The interdependence of importing foreign technology and interlinking it with domestic technical development.

- The key roles of education and training, science and technology, knowledge accumulation and promotion of strategic industries.
- The role of the state in co-ordinating and developing long-term policies for industry and economic development.

Lundvall (1998) also supports the view of List and concludes that the important elements of a national innovation system is supported through four elements or knowledge factors which are:

- Knowledge about facts
- Knowledge about principles and laws of nature
- The skills and capabilities
- The know how

The key to success of a nation is in its ability to mix these four knowledge factors.

In essence the above views are captured in the following summary by Freeman (1995) published in the Cambridge Journal of Economics, page 5, where he states that “Whilst external international connections are certainly of growing importance, the influence of the national education system, industrial relations, technical and scientific institutions, government policies, cultural traditions and many other national institutions is fundamental”.

O’Malley & O’Gorman (2001) believe that the motivation for FDI to Ireland is generally attributable to factors such as sustained Irish Government policies using low corporation tax rates as well as grant incentives, access to large European markets together with an English speaking labour force and the availability of skills required by rapidly growing “high-technology” industries (Kennedy *et al*, 1988). O’Malley and O’Gorman use the “diamond” model as developed by Porter (1990) to analyse the sources of competitive advantage of the indigenous software industry in Ireland. This model can be usefully applied in this instance in assessing the competitive advantage of Ireland in attracting FDI more

generally, and in particular as it relates to the attraction of R&D investment by MNCs in the technology sector. Porter argues that there are four main determinants of the competitive advantage of an industry – namely, factor conditions, domestic demand conditions, related and supporting industries within the country, and firm’s strategy, structure and rivalry among domestic firms. Porter acknowledges that the role of government can be significant, affecting competitive advantage by influencing the four principal determinants. Porter also argues that competitive industries generally occur as part of “clusters” of connected industries, for reasons arising from the operation of the four principal determinants of competitive advantage. There have been a number of critiques of Porter’s theoretical model – it has been argued that Porter’s theory lacks precision, determinacy and strong predictive ability (Grant, 1991) and that it would be difficult to refute it (Davies et al, 1995). It has also been argued that the theory does not work well for small open economies such as New Zealand, Canada and Ireland (Rugman & D’Cruz, 1993). Despite these views, Porter’s model is none-the-less a useful framework for examining the factors leading to competitive advantage in the technology sector in Ireland, of which the development of an R&D base is key. The role of Government for example in Ireland has been key to the development of a business and regulatory environment that would be favoured by MNCs – thus influencing each of the four determinants of competitive advantage to different extents. O’Malley and O’Gorman indicate that clearly the third-level education system is important as a “factor creating mechanism” for the technology industry to use Porter’s terminology. This is significant in the Irish context as Ireland has the highest percentage of graduates in Science and Engineering in the EU at 21.7%, compared with the EU average of 11.3%.

It has been noted that indigenous success is based on “comparative advantage”, while success in attracting FDI is based on “absolute advantage” (Jones, 1980). Barry and Bradley (1997) comment that an economy can lose its absolute advantage overnight while comparative advantage can change but can never be annihilated. Dicken *et al* (1994)

discuss the potentially complex web of relationships which can exist between the subsidiary of the MNC and its host economy. They indicate that subsidiary units which have “higher level” functions such as R&D and which employ advanced technologies, are more likely to have beneficial local effects, by developing purchasing linkages and by raising technological and skill levels in their own workforce and among local suppliers and related companies. At the same time however, the occurrence of such effects depends on the host economy having or developing the required goods, services and skills. An overview of the investment infrastructure for MNCs currently operating R&D facilities in Ireland would map with this theory as FDI investment has fed local indigenous industries creating synergistic benefits both for local and national economies. In addition, Rugman and Benett (1982) have suggested that the decentralization of R&D activities conducted in foreign subsidiaries contributes, in the host country, to the technological development of other firms in the same industry. As Barry and Bradley (1997) comment “spin-off benefits of FDI might also include a role as incubators for new entrepreneurs”. Although positive spillovers from MNC subsidiary R&D occur only when local firms have the absorptive capacity to understand and utilise the spilled knowledge (Birkinshaw, 1998). Rugman and D’Cruz (2000) propose a model of the flagship firm, at the nexus of a network of suppliers, sub-suppliers, customers, and non-traded service partners and that this is true of Ireland where the MNC may be the lead firm in an industry or in a geographic area of the country. Some groupings have occurred in various industries, most notably in the technology sector in Ireland. O’Higgins (2002) comments that Ireland as a whole has become a major conduit of US technological innovation into Europe. There are a number of examples in Ireland such as Analog Devices, in Limerick, Boston Scientific and Medtronic in Galway and Bausch & Lomb in Waterford which have gained centre of excellence mandates from their respective parents. These operation employ a large number of dedicated R&D staff together with manufacturing and related services which has in turn fuelled the local economies, not just through direct employment but through the creation of spin-off local enterprises

and an impressive sub-supply base that in itself offers a strategic advantage to both parties (this would contradict Porter's theory as he predominantly excludes foreign-owned firms when identifying competitive industries and clusters). To map with the resource requirements of the corporation, the respective universities and institutes of technologies have responded and evolved to meet the needs of industry. As White (2003) noted, through linkages, firms create indirect employment and support the development of a local supplier base, which in turn leads to further investment (Kennedy, 1991, Turok, 1993, Phelps, 1993). Significantly, by linking downwards into local networks, MNCs often gain access to sources of unique, tacit knowledge and thereby enhance their innovative capacity (Lyons, 2000; Zanfei, 2000).

2.6 Strategies for Attracting Foreign Direct Investment

Calliano (2000), in the specific case of Ireland, believes inwards FDI was the outcome of strategies specifically designed to attract it, a behaviour that is consistent with the assertion by Lenway and Murtha (1994) that nations formulate strategies to attract FDI. Several analysts have attempted to explain the causes of the "Irish miracle" (Gray, 1997, Sweeney, 1998, Barry, 1999, MacSharry & White, 2000 and Hardiman, 2000). While they disagree in the literature on the weights assigned to various external and internal factors, there is some agreement that several propitious conditions and events came together in the late 1980s and 1990s that brought about an amazing transformation. House & McGrath (2004) indicate that what is distinctive about the Irish case is that it is distinguished by a unique set of institutional innovations for creative, dynamic, and self-reflexive governance for social and economic development. Calliano states that "Ireland's strategies have been developed to specifically attract those MNC's value chain activities most valuable to the country, where the country's policymakers specifically targeted MNCs competing in knowledge intensive industries such as electronics and software". IDA Ireland was established for the sole purpose of attracting FDI and over the years has indeed adopted targeted

strategies (Calliano describes them as “aggressive”) for attracting to Ireland, distinct types of mobile investment, including investment in particular industry sectors. The attraction of R&D investment is currently a core strategy adopted by the agency and recent success has been verified by the attraction of large scale MNC investment in R&D (e.g. Bell Labs, Medtronic, IBM, BMS, HP, Microsoft, Johnson & Johnson). The strategy to attract R&D investment is clear from the agency’s mission statement – “We will win for Ireland, the best in international innovation and investment so as to contribute to the continued transformation of Ireland to a world-leading society, rich in creativity and learning”. Calliano’s analysis of the Irish experience indicates that the institutions that are the building blocks of the country’s ability to attract R&D investment are;

- R&D Infrastructure and ability to attract large pool of researchers
- Labour Skills
- Educational system (investment by Government of 13% of budget pa)
- Telecommunication infrastructure
- Geographic location
- Being US friendly
- Good relationships between trade unions and management

His study, although specific to R&D investment, is not backed up by empirical results and seems to be based more on general hypothesis and secondary data. As a system of technological innovation is created, and FDI generated, a positive self-reinforcing cycle is triggered he argues that promotes a continuous upgrading of location specific resources. This, in the Irish context appears to have happened as public monies are allocated to education and infrastructure deficits under various National Development Plans (www.ndp.ie).

In particular, he comments that the success of the development of an R&D base in Ireland in part relied on the establishment of “technological parks modelled after those in Silicon Valley”, and cites the National

Microelectronic Research Centre (now Tyndall Institute) in Cork as an example of one of the most advanced public research centres in Europe. He notes that a country's advantage in labour quality may be developed by fostering a co-operation between the educational system, firms and research institutes. This is consistent with the observation that public institutions and universities promote the diffusion of knowledge (Carlsson and Jacobson, 1993; Carpano and Rahman, 1997). The establishment of Science Foundation Ireland in 2000 by the Government as a co-ordinating body for industry and academic collaborations in R&D activities, with €650m funding is significant in the given context and links with observations from the literature about having the correct institutional frameworks in place.

2.7 Attractiveness of Ireland as an Investment Location

More recently, FDI is credited as a key catalyst behind the reversal of Ireland's economic fortunes (Breathnach, 1998; Sweeney, 1998) and White (2003) comments that Ireland, like many places, targets those sectors perceived to create the greatest opportunities for value creation such as Life Sciences (pharmaceuticals and medical devices), ICT and R&D activities.

Barry and Bradley (1997) point to surveys of executives of newly arriving foreign companies in the technology sector which indicate that their location decision is now strongly influenced by the fact that other key market players are already located in Ireland. In fact, IDA Ireland relies strongly on the reference sell model for new companies looking at Ireland as a potential investment location. What is not clear from the work of Barry and Bradley however, is if this is true specifically of firms investing in R&D activity in Ireland.

They also provide a number of explanatory factors for the attractiveness of Ireland as a base for inward FDI more generally;

- More highly educated and trained labour force
- Large scale improvement of the physical infrastructure, facilitated by regional aid
- Fiscal stabilisation in the mid 1980's
- Move towards consensual wage bargaining
- Liberalising trading arrangements
- Macroeconomic stability
- Improving stock of human capital

Usefully, they compare Ireland to Greece (similar, small open economy) – this shows that trade liberalisation, while necessary, is not a sufficient condition for large scale FDI flows and they explain it on the basis that the above factors do not appear to have taken place in the Greek economy, “substantially reducing its attractiveness as a platform for multinational investment”. They see the future for FDI in Ireland as being likely to involve both a shift towards greater complexity (new products, emerging technologies), as well as a more rapidly modernising indigenous sector. They also apply Vernon’s product life cycle model to the “stylised Irish facts”; early FDI in simple standardised products (screw-driver operations), recent shifts to the maturing products (e.g. Intel Pentium chips) to a potential for attracting more R&D in the area of new products. This maps with the strategy of IDA Ireland for moving companies up the corporate value chain to undertake more complex activities, in particular R&D led activities which are seen as higher-value, knowledge driven functions.

O’Higgins (2002) offers the model of the “flexible developmental state” (as developed by O’Riain, 2000) as an exploratory framework for the development of Ireland as an attractive location for investment by MNCs. The government in this model plays a key role in integrating local and global business in three ways (see Appendix 3). One is to attract FDI and then build local networks of production and innovation around the subsidiaries of MNCs. The second is to cultivate indigenous networks of innovation and encourage them to internationalize and the third is the

creation of a stable macro-economic and financial environment that fostered adaptation to, and participation in the global economy. The “flexible” component then of the flexible developmental state is that the Irish government working through state agencies (like IDA Ireland, Enterprise Ireland) shaped the organisational cultures and capabilities of both indigenous firms and MNCs but without directly dictating their activities. Local institutions such as development agencies White (2003) comments or universities are geared to deepen firm embeddedness by supporting locally based affiliates in their drive to upgrade and develop their internal capacity (Peck and Burdis, 1996). MacSharry and White (2000) note that the positive reversal in Ireland’s fortune is commonly attributed to actions taken by government, culminating in a combination of interrelated benefits. She believes that the long active history of FDI provided a learning medium for investing companies and their subsidiaries, its agencies and the indigenous economies and that these parties worked together over the years to expand the value derived from the FDI experience, to the extent that now Ireland is seen as a “sophisticated knowledge base for higher-value activities, rather than just a manufacturing outpost”. This model is useful in that firstly, it provides a sophisticated framework for the development of the attractiveness of Ireland as an investment location. It goes beyond the more traditional factors as espoused by previous authors on the topic as it charts a developmental chain for FDI to Ireland which allows one to assess several factors together, rather than in isolation. Although it does not refer specifically to the attractiveness of Ireland as an investment location for R&D, it does point to “higher-value” activities, of which R&D investment is key. Under the iceberg factors are also mentioned – like MNCs for example serving as training grounds for skills upgrading, resulting in a majority of MNCs by the 1990’s being led by Irish nationals. O’Higgins also devotes considerable credit to IDA Ireland as an investment development agency, citing many intangibles such as the skills, personalities, experiences and insights of its people, including an in-depth understanding of client needs as well as a foresight to identify and pursue opportunities ahead of rivals (an example is given of the establishment of

an Intel microprocessor plant in 1989). In fact, she goes so far as to say that she would apply the Hamel & Prahalad (1989) term “strategic intent” to qualify targeting activities of the agency. Other critical intangibles include the web of contacts built up by the agency with important decision makers in companies abroad, through the establishment of an advanced network of offices in overseas territories.

On a more negative note, O’Higgins notes that the low Irish corporation tax rate somewhat limits the value of tax write-offs against R&D expenditures but that development agencies can offer discretionary grant aid to encourage R&D on a case by case basis. This clearly could be considered as part of the reason why MNCs locate R&D facilities in Ireland. However, although financial incentives have been studied extensively for their effect on investment decisions, it is generally concluded that they have relatively little impact on location choice (Batchler & Clement, 1990; Tatoglu & Glaister, 1998). It has been noted (Gilmore et al 2003) that FDI generally can be quite shallow and therefore transient if the investors are attracted merely by financial inducement rather than fundamentals such as skilled labour (Dunning et al., 1998). Kearns & Ruane (1999) note that R&D active firms remain longer in Ireland than non R&D actives ones since they would incur higher exit costs in capital expenditure on specialised facilities and the loss of expert personnel.

Aftercare is seen by some authors as an essential support to MNC subsidiary management, to facilitate access to various local resources, to confirm the Irish location decision, and to embed the subsidiary in the local business and economic community (Young *et al* 1994).

O’Higgins notes that for a relatively small, integrated body, mixing attraction and maintenance of relations comes naturally to staff of IDA Ireland. Overall, the framework of the flexible developmental state is useful in that it helps resolve several apparent inconsistencies in relation to the attractiveness of Ireland as a location for investment by MNCs and

hence for our research aim. According to Kenichi Ohmae (2000), Ireland was well positioned to be transformed in the high-tech knowledge era. Paradoxically, being peripheral, with a small population without an establishment resistance to innovation, renders it easier to effect change and make a difference.

2.8 Summary and Conclusions

An analysis and review of the literature indicates that the development of an FDI base in Ireland has received much academic attention. Whilst a number of commentators concur on the factors that helped contribute to the success of Ireland as an investment location, there is little agreement as to what specific factors actively contributed, either solely or in whole to the investment decisions made by MNCs, particularly as they relate to the climate of today. What is less evident from the literature is the factors that specifically influence MNCs when looking at Ireland as a base for investment in R&D activities. References to investment in R&D type activities seem to be bundled up into generic descriptions or discussions around the attraction of higher-value jobs, of which clearly, R&D type employment is part. It is clear from my analysis however that this points to a distinct gap in the literature as it relates to the attractiveness specifically of Ireland as a location for R&D type investment. Several factors could be considered to explain this fact – for example, the international success of Ireland is generally discussed in overall investment terms, without breaking down the individual investment projects by “type of investment” (eg manufacturing, shared services, financial services etc). Another factor that could be contributing to the literature dearth in this area is that the multi-national base in Ireland was originally built up around the success of manufacturing-type investment and this it would seem has gained most academic comment. In addition, as the Irish foreign-direct investment model has reached a level of maturity on more traditional investment, the country has by and large only secured more advanced “higher-value” functions in the last decade. As White (2003) notes, for much of Ireland’s recent economic history, FDI was

associated with rural branch plants and as a symbol of Ireland's dependent position in the world economy (O'Hearn, 1998, Shirlow, 2000). None-the-less, it is significant that the analysis of literature points to several gaps as it relates to the research question – namely the attractiveness of Ireland as an investment location for R&D activities specifically. This analysis therefore helps better frame our research question as it provides an opportunity in conducting the qualitative research to focus discussions more tightly. As such in the authors view the following summarises the main factors which influence the investment decision making process of multinational companies,

- Social, Political and Cultural factors
- Past experience of a country
- Access to free trade
- Educational structures
- Tax structures
- Availability of skilled labour
- Financial assistance
- Cluster effect – in relation to supply chain partners and academia
- Quality of Life

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Research Methodology

3.1 Introduction

Philips and Pugh (1994) identify three characteristics of good research;

- 1) It is based on an open system of thought
- 2) One must be prepared to examine data critically and to request the evidence behind conclusions drawn by others
- 3) One should try to generalize the research but within stated limits

This is a useful framework in commencing research of this nature. The research design itself then is crucial in securing both the success of the research methods and the extraction of valuable research data. Kinner et al. (1991) state that a research design is the basic plan that guides the data collection and analysis of the research project. The design is a plan for selecting the sources and type of information used to address the research objective. It also provides a useful framework for specifying the relationships among the study's variables as well as being a blueprint that outlines each procedure from the hypothesis to the analysis of the data (Copper et al., 1999).

3.2 Philisophical Position

A knowledge of philosophy can help the researcher to recognise what designs will work and what will not (Easterby-Smith *et al*, 2003). The two traditions are positivism and interpretivism (represented under the rubric of phenomenology). Berg (1998) stated that many authors recommend that social scientists maintain a value neutral position. From this perspective, social scientists are expected to study the world without imposing their own views.

Comte (1853) coined the term positivism originally, stating that there can be no real knowledge but that which is based on observed facts. This statement contains two assumptions. First, an ontological assumption that reality is external and objective and second, an epistemological assumption that knowledge is only of significance if it is based on observations of this external reality. (Easterby-Smith *et al*, 2003). The idea of interpretivism or social constructionism then, as developed by authors such as Berger and Luckman (1966), Watzlawick (1984) and Shotter (1993), focuses on ways that people make sense of the world, especially through sharing their experiences with others via the medium of language. As an approach, social constructionism is referred to as an interpretive method (Habermas, 1970). The reality of social constructionism then is that reality is determined by people rather than by objective and external factors. The focus then is on what people, individually and collectively, are thinking and feeling (Easterby-Smith *et al*, 2003).

Constructivism works with conviction directly (Jankowicz, 2005) and adopts an ontology and epistemology that;

- a) Legitimises the value and weight of individual belief and conviction
- b) Avoids any search for truth and instead focuses on a socially agreed understanding
- c) Facilitate the constant, conscientious, and careful monitoring of the personal, social and situational factors

Interpretivism then makes no distinction between the investigator and the person doing the research; epistemologically, their views and understandings are of equal status (Kelly, 1995/1991). The aim then is to increase the general understanding of a situation and to gather rich data from which ideas are induced. This approach allows one to look at how change processes over time, to understand people's meaning, to adjust to

new meanings and ideas as they emerge and to contribute to the evolution of new theories.

Positivism has come under criticism for a variety of reasons including the fact that it is thought that many researchers are not independent, the process itself imposes a number of constraints, and it is often difficult to separate people from their social context. Increasingly, authors and researchers have attempted to mix methods to some extent, because it provides perspectives on the phenomena being investigated (Easterby-Smith *et al*, 2003). Fielding and Fielding (1986) advocate the use of both quantitative and qualitative methods in order to balance the research objective. However, Easterby-Smith *et al* warn against the mixing of methods simply for the sake of getting a slightly richer picture, because it may lead to contradictions and confusions.

This research is fundamentally exploratory in nature. Given the exploratory nature of the research, and the type of research data required (opinion, beliefs, values), the philosophical approach taken by the author is one of anti-positivism. The author believes that this approach best matches with the research aim and objectives. Whilst research methods which would attract quantitative data could be considered useful, they would not lend themselves well to the subject matter. In addition, as a number of the interview participants hold senior management positions, it was felt that the extraction of typical survey type data from this group would have been very difficult. Adopting a positivist approach and the inherent quantitative techniques would the author feels, not reveal the “thick descriptions” required. The epistemological underpinning then of the research methods is based on the interpretivist approach. This matches with the philosophical approach taken by earlier writers who have undertaken similar studies in the area of FDI – White (2003), Calliano (2000), Grimes and Collins (2003), Delany (2000) and Gilmore *et al* (2002).

3.3 Secondary and Primary Research

For the purposes of the research, both secondary and primary research has been undertaken. In conducting the literature review, a number of secondary research sources were reviewed. Secondary research was useful in that it allowed the researcher the opportunity to assess what authors have written in the past about the research topic or related topics. This was useful in the formulation of concepts, theories and the application of models. Clearly however, there is a limitation on the purity of the information as it was developed for another purpose.

3.4 Qualitative v Quantitative Methodologies

A number of debates are evident from the literature on the value of using qualitative over quantitative techniques (Easterby-Smith, 2002 Jankowicz, 2005). Van Maanen (1983) defines qualitative techniques as “an array of interpretive techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world. Kinner et al. (1991) described a number of benefits to employing quantitative methods - utilising quantitative methodologies can be fast, economical, cover a wide area, and are very useful at identifying generalities, in particular when statistics are aggregated from large samples. Kinner et al. (1991) also outlined a number of weaknesses in using qualitative methods, including artificiality and that it is not very effective in the generation of theories. Van Maanen (1993) argued that the strengths of qualitative research include an increased potential for creativity, and the ability to look at change processes over time.

The information of most value for the purposes of the research question can be gleaned through the application of qualitative techniques.

3.5 Data Analysis Methodology

Given the exploratory nature of the research and the need to identify the fundamental beliefs and attitudes of participants, the author decided to use the grounded theory approach to the development of emerging key themes. The theory was developed firstly by Glaser and Strauss (1967), who indicated that the key task of the researcher is to develop theory through “comparative method” – basically looking at the same event in different situations. Glaser and Strauss propose two main criteria for evaluating the quality of a theory;

- 1) It should be sufficiently analytic to enable some generalisation to take place
- 2) It should be possible for people to relate the theory to their own experiences, thus sensitising their own perceptions

In the case of this research work as the author knowingly picked a research area which was of interest and about which some information was already known. Silverman (2000) believes that qualitative methods are in danger of being dismissed as undisciplined journalism as there is nothing to prevent the researcher picking evidence from masses of data to support their own views. Given this, he outlines several principles to aid the data analysis process, including;

- Refutability
- Constant comparison
- Comprehensive data treatment
- Tabulations

As Easterby-Smith *et al* (2003) noted, the results gleaned from the constructionist research should be believable and they should be reached through methods that are transparent. The author, through the outline of the methodological approach, has sought to ensure that there was clarity of approach relating to how access was gained to organisations, what

processes led to the selection of informants, how data was recorded and what processes were used to summarise and collate it.

Grounded analysis provides an open approach that is often linked with the notion of grounded theory (Easterby-Smith *et al*, 2003). Typically with qualitative data, themes, patterns and categories need to be systematically analysed. Jones (1987) noted that rather than forcing data within logico-deductively derived assumptions and categories, research should be used to generate grounded theory which fits and works because it is derived from the concepts and categories used by the social actors themselves to interpret and organise their worlds. Charmaz (1983) argued that the stress is on the process of discovery and that theory development leads grounded theory to characterise itself in certain ways. Firstly, data collection and analysis proceed simultaneously and secondly both the processes and products of research are shaped from the data rather than from preconceived deduced frameworks. This theory works well for the analysis in particular of transcripts of depth-interviews and hence is the chosen method here for data analysis.

Usefully, Easterby-Smith *et al* (2003) outline a seven stage process to undertaking such analysis;

- 1) Familiarisation – unrecorded information as well as recorded should be drawn upon. Note should be taken of the relationships established between the researcher and the interviewees and the level of confidence about data offered
- 2) Reflection – evaluation and critique become more evident as the data is analysed in the light of previous research and academic texts
- 3) Conceptualisation – there is usually a set of concepts which seem to be important for understanding what is going on and the concepts which respondents mention are articulated as explanatory variables

- 4) Cataloguing concepts - can the concepts that emerge be transferred into notes as a reference guide
- 5) Re-Coding - with concepts known, it should be possible to go back and check against the original data
- 6) Linking – Analytical frameworks and explanations are becoming clearer and patterns start to merge between concepts. One can begin to link the key variables into a more holistic theory where empirical data is linked with more general models
- 7) Re-evaluation – More work may be needed in particular areas as the analysis may have omitted some areas or may have over-emphasised others

Since the early stages of work that was done on grounded theory, there has overall been considerable development of the method, principally by Glaser (1978, 1992, 1998), by Strauss (1987), and by Corbin (1990, 1998). More recent theories have showed Glaser advocating a more open flexible approach in which the theory emerges from the data, almost without human intervention to Strauss and Corbin (1990, 1998) who moved to increased prescription and elaboration using data sampling processes (open, axial and selective).

This approach provided a useful framework to assist the researcher in the analysis of the data received from the depth-interviews, wherein the theories developed from the depth-interviews were tested. The “data” under analysis here included the original interview transcripts, tape recordings of the depth-interviews, field notes made during the interviews, and observations made by the author during the data collection procedures.

3.6 Data Collection Methods

The interview creates the opportunity for the researcher to probe deeply to uncover new clues, open up new dimensions of a problem and to secure vivid, accurate inclusive accounts that are based on personal experience

(Burgess, 1982). Easterby-Smith *et al* (2003) comment that interviews, both semi-structured and unstructured, are appropriate methods when;

- a) it is necessary to understand the constructs that the interviewee uses as a basis for opinions and beliefs
- b) one aim of the interview is to develop an understanding of the respondents “world” so that the researcher might influence it

Eichelberger (1989) argued that the role of an interviewer requires more skill and training than most people realise. He believed that in order for an interviewee to answer the questions honestly and accurately, the situation must be supportive. Jones (1985) highlights a number of issues that researchers need to consider for interviews to be successful – stating that there is no such thing as “pre supposition less” research. She advocates that in preparing for interviews, researchers will have “some broad questions in mind”. Borg *et al.* (1989) described ten steps that should be taken into account when planning and conducting a research interview – ranging from stating the purpose of the interview, structuring the interview, conducting a pre-test, and finally analysing, and interpreting the results.

Cooper *et al.* (1995) suggested three conditions that can help the interview to be a success. Firstly, the researcher must ensure that the respondent has the relevant information and is willing to disclose it. It is then assumed that throughout the interviews the respondents are willing to disclose pertinent information. Secondly, it is necessary that the respondent understands their role and keeps the information imparted strictly within the scope of the topic that is being researched. Thirdly, the respondent must be adequately motivated to co-operate. This is the responsibility of the interviewer and can be helped by building a good initial rapport. Mayo (1949) commented that the interviewer in essence needs to listen to what the person wants to say and what they does not want to say, without helping.

3.6.1 *Interview Process*

A total of thirty stakeholders were contacted firstly by telephone and then by e-mail and asked to participate in an informal interview. The follow-up tailored e-mail to each individual, allowed the author to provide an introduction to the nature of the academic research, the background to the thesis topic and to outline the request for interviewee participation. The key stakeholders were identified by the author as having a specific and direct interest in the R&D agenda in Ireland as they are all R&D or Technology Managers within their respective firms. This information was known to the author as an employee of IDA Ireland. Whilst this could be interpreted as creating an inherent interview bias at the outset, the author believed that gaining access to key influencers and stakeholders would serve to better inform the research question.

A total of twenty-four interviews were completed between June and August 2007. Six individuals who were requested to participate, either declined or were unable to be facilitated within the required research timeframe, due to their work schedules. Interviews were conducted at the office premises of the interviewee and were recorded and later transcribed. Four interviews were conducted by telephone and recorded due to difficulties relating to access. Each interview lasted approximately one hour. Confidentiality was assured to each participant, given the potentially commercially sensitive nature of the research. Given the nature of the candidates secured, the interviews could be considered as key-informant interviews.

In order to help facilitate the conversation, a number of questions were developed as interview aids. Themes developed from the Literature Review as well as the research objectives helped to inform this. The author found that invariably, the actual interview was led by the interviewee, such was their interest in the topic. The author had on occasion to refocus the discussions by posing the research question.

3.6.2 Interview Participants

INTERVIEW NUMBER	JOB TITLE	DESCRIPTION OF ORGANISATION
1	Managing Director	Technology Industry Lobby Organisation for Indigenous and Foreign-Owned MNCs.
2	CEO	National Policy & Advisory Board for Enterprise, Trade, Science, Technology & Innovation.
3	Director	National Policy & Advisory Board for Enterprise, Trade, Science, Technology & Innovation.
4	Global Technology Manager	MNC specialising in the global production of contact lenses.
5	Research Manager	MNC, specialising in telecommunications peripherals.
6	Research Manager	MNC, specialising in the production of CMOS integrated circuits.
7	R&D Manager	MNC, specialising in the design and production of medical equipment.
8	R&D Manger	MNC. Specialising in development of products for global communications markets.
9	R&D and Technology Manager	MNC. Specialising in development of products for global technology solutions.
10	R&D Manager	MNC. R&D centre for cardiovascular medical devices.
11	Technology Manager	MNC. R&D unit in the life science sector.
12	Technical Manager	MNC. R&D Division of global communications, networking equipment, software and services company
13	R&D Manager	MNC. R&D centre for cardiovascular medical devices.

14	Managing Director	MNC providing solutions to automotive, food, electronics sectors & EMEA development site.
15	R&D Manager	MNC responsible for manufacture, distribution & marketing of all non US products in engineering sector.
16	R&D Manager	MNC. R&D group in the medical devices sector.
17	R&D Manager	MNC. R&D unit in the engineering sector.
18	R&D Manager	MNC. R&D Division in the Medical Device industry – orthopaedics.
19	Technology Manager	MNC. R&D group in the ICT sector – power supplies.
20	Research Manager	MNC. Pharmaceutical sector.
21	R&D Manager	MNC.R&D group in the Medical Device industry.
22	Research Manager	MNC. Leading provider of programmable logic semiconductor devices including advanced integrated circuits and various software design tools.
23	R&D Manager	MNC. R&D team in the engineering sector.
24	R&D Manger	MNC. R&D team in the Pharmaceutical industry.

3.7 Limitations Of Study

A number of limitations became obvious during the course of the research process. Managing “visual cues” and other observations had to be matched with ensuring conversation flow during the interviews. It was more difficult to manage conversation flow for those interviews that were completed by telephone. The author found that some interviewees reacted negatively to the use of a tape-recorder.

Where possible, the author attempted to reduce any perceived limitations to the research process.

3.8 Conclusions

This chapter examined the logic behind the choice of adopting specific research methodologies. Based on the exploratory nature of the research and the need to identify the beliefs and attitudes of key stakeholders, it was decided to select qualitative research methods as being the most appropriate. The importance of the need to adapt qualitative research methods was further underlined after completion of the literature review, where qualitative methods were most frequently employed by key authors. In addition, given the gaps as identified in the literature regarding the attractiveness of Ireland as a location for R&D activities specifically (as opposed to general FDI), it was felt by the author that information gleaned through one-to-one interviews with direct stakeholders in the Irelands R&D arena, would provide data that would best link with the research objectives under discussion.

CHAPTER 4

PRESENTATION & ANALYSIS OF RESULTS

4.1 Introduction

This section will present and analyse the principal findings of the research from the in-depth interviews. Findings are presented and matched to the research objectives. Given the nature of the key-informant depth-interviews, data collection and analysis was considered in part, to happen simultaneously.

4.2 Themes From Literature Review

A number of themes emerged from the literature review which allowed the author to categorise the research findings in order to best address the research aim. These themes focus on the factors that, in the opinion of the authors, make Ireland an attractive location for FDI and in particular R&D investments. The research aim principally poses a question as to the factors that influence decisions by MNCs in establishing R&D facilities in Ireland.

The influencing themes that emerged from the literature review are as follows;

Government Economic Policy
Educational System
Labour Skills
Financial Incentives
Institutional Frameworks
Cultural Fit
Role of Investment Development Agency
Past Experience of host location

In order to focus the research aim and to make for a more holistic analysis of the research question, in-turn supplementing the themes from the literature, the author complemented these themes with the development of question aids for the depth-interviews which match with the research objectives (see Appendix 4).

4.2.1 Themed Question Aids For Depth Interviews

- 1) Opinion as to investment landscape in Ireland for R&D
- 2) Importance of a pre-existing manufacturing facility toward the original establishment of R&D and its role in securing new investment for the future
- 3) Opinion as to the top three / five key factors influencing decisions by MNCs to invest in R&D facilities in Ireland
- 4) Possible attainment of a technology focused R&D Cluster in Ireland by 2015

4.3 Primary Research Findings

Each interview commenced with a reference by the author to the pre-briefing material as sent by e-mail to each participant. In so far as it was possible to control, the same questions were posed to each participant. A general question was posed on FDI to open discussions. With some interviews, tangential topics arose which required the author to steer the conversation flow using probing techniques.

4.3.1 Opinion as to investment climate for FDI in Ireland

Ireland continues to be an attractive location for FDI. Opinions varied across all twenty-four interviews as to the current investment landscape in Ireland for R&D however. There was consensus on the need for Ireland to advance its already mature FDI model to enable it to take advantage of more sophisticated inward investment projects in the future. Securing

investment in R&D related activity was seen as a key driver in this regard. A number of infrastructural deficits were pointed out (institutional frameworks, number of researchers, co-ordinated approach to research initiatives between companies and Universities etc) which were seen as potential blockers to success. The view of the interviews was that Ireland was perceived to be lacking in structure and expertise in comparison with the R&D clusters of the US and indeed parts of Europe. Also the need for a stronger base of innovative indigenous companies both existing supplier in the supply chain to MNC's and indeed technology start-up companies was highlighted as a gap in Ireland's evolution.

A number of respondents made reference to advancement made in Ireland through the establishment of Science Foundation Ireland and also numerous references were made to the large R&D projects such as Bell Labs, Georgia Tech Research Institute, Wyeth and Intel.

One interviewee indeed welcomed the recent focus of IDA Ireland back on manufacturing activities, which has been "the catalyst on which the knowledge economy was built". Overall, it was felt that Ireland was now ready to receive a greater number of high-level research projects, with the way being paved by the work of IDA Ireland and Science Foundation Ireland in this regard. Ireland faces competition in particular for R&D investment from primarily the US followed by Germany and France with the Asian economies and in particular China, presenting the greatest competitive threats.

"IRELAND HAS DONE VERY WELL.... IRELAND HAS BEEN ONE OF THE MOST SUCCESSFUL COUNTRIES WITH REGARDS TO FDI"

"IRELAND IS MAINTAINING THE MOMENTUM FROM THE CELTIC TIGER AND THE PERCEPTION OF IRELAND IS QUITE GOOD... THE COMPANIES THAT HAVE DONE R&D AND PUT THEIR TOE IN THE WATER SEE AN ENVIRONMENT THEY CAN USE HERE"

"THE REPUTATION IS OUT THERE IN THE RESEARCH COMMUNITY. EUROPEAN SCIENTISTS BELIEVE THAT IRELAND IS A MODEL TO FOLLOW"

“IRELAND HAS BEEN EXTREMELY SUCCESSFUL CONSIDERING IT IS SUCH A SMALL COUNTRY AND I THINK WE CAME FROM BEHIND.....WE HAVE FOCUSED A LOT ON MANUFACTURING IN THE PAST I THINK WE ARE AT THE STAGE NOW WHERE WE HAVE TO THINK IS THAT SUSTAINABLE AND THE BIG QUESTION IS WHERE IS IRELAND GOING TO BE OVER THE NEXT 20 YEARS? R&D INVESTMENT IS PERHAPS THE ANSWER”.

“THERE IS SOME CLEVER RESEARCH GOING ON AND WHERE THE COMPANIES HAVE BUILT UP A GOOD RELATIONSHIP WITH THE UNIVERSITIES IT HAS WORKED”

“THE OVERALL COMBINED PACKAGE THAT IRELAND INC OFFERS IS STILL VERY ATTRACTIVE”

“SOME OF THE BEST PEOPLE IN THE WORLD COME HERE AND SPEND TIME WORKING HERE BECAUSE SOME OF THE BEST, MOST NOVEL AND UNIQUE RESEARCH IS GOING ON AT AN ACADEMIC LEVEL, AT AN APPLIED LEVEL AND AT A BUSINESS LEVEL”

Discussion

Clearly the literature review pointed to the success of Ireland as a location for FDI more generally (Grimes, 2003; O’Malley & O’Gorman, 2001) and this is backed up by responses found in relation to this opening theme. However, the literature review, being more generic did not describe specifically the investment climate for investment in R&D activities at the moment, so the feedback from the depth-interviews here is unique and provides a good framework for a discussion relating to the research aim.

4.3.2 Importance of a pre-existing manufacturing facility toward the original establishment of R&D and its role in securing new investment for the future

Results from the depth-interviews indicated that almost all respondents firmly believed that in principle, R&D investment in Ireland has been secured on the back of existing manufacturing operations. All do, there was a view that R&D could theoretically be a stand alone entity, but that the benefits of linking into the manufacturing operation and related expertise was an extra layer of competitive advantage.

There was a sense that Ireland has struggled to attract in new R&D investment where the parent company does not already have an existing operation in Ireland. The successful operation of a manufacturing facility and the attainment of a good reputation in the eyes of the parent company

made it easier for Irish management to move to move up the value chain into R&D activities, with the emphasis largely on development and not research work per se.

“IF YOU CAN TIE R&D INTO ANY OF THE OPERATIONS HERE IT MEANS THAT THE MANUFACTURING IS LINKED TO THE R&D AND IT IS MUCH HARDER THEN FOR US TO LOSE THAT”

“I HAVE A SUSPICION THAT IT IS GOING TO BE MORE DIFFICULT FOR IRELAND TO ATTRACT GREENFIELD R&D INVESTMENT... I CAN HOWEVER SEE US BEING SUCCESSFUL AT CURRENT ICT COMPANIES ACTUALLY TAGGING ON A BIT OF R&D”

“THEY PROBABLY CAME HERE BECAUSE THEY ALREADY HAD A HISTORY OF OPERATING HERE AND THEY ARE COMFORTABLE WITH THE OPERATING ENVIRONMENT AND AT WHAT IRELAND IS GOOD AND BAD AT”

“PRIMARILY IT WOULD BE TO DO WITH THE FACT THAT THEY ALREADY HAVE A PRESENCE HERE”

“WHERE THERE IS A CUSTOMER SUPPORT SIDE TO THE MANUFACTURING PROCESS THEN ENGINEERS BECOME AWARE OF NEW PRODUCTS AND MODIFICATION REQUIREMENTS FOR THE NEW PRODUCT DEVELOPMENT PROCESS. THIS IN ITSELF CAN DRIVE DEVELOPMENT WORK AT A SITE”

Discussion

Porter (1990) commented on the competitive advantage of a nation being rooted in the resources that a country can offer to perform specific value-chain activities. In the case of Ireland, it is evident then that FDI traditionally built up a strong manufacturing base that earned the country and the operating plants a strong reputation in the eyes of MNCs. This could explain why having an existing manufacturing facility was seen by many respondents as a critical success factor in the subsequent addition of R&D facilities to Irish plants. The successful track record of the Irish entity was a critical advantage in winning new investment and in particular R&D investment, as the competency of the Irish location mitigated the associated risk of putting new projects into Ireland. Bidding wars for repeat investments will be won most likely by affiliates whose host country represents a strategically important location for the MNC (Mytelka, 2000). Indeed, McAleese and Counahan (1979) referred to the nature of foreign firms in Ireland as “stickers not snatchers” which also

matches with this theory. Equally, Kagut (1997) indicated that a firm with greater experience of a location is more likely to invest than a firm with less experience and Buckely & Casson (1985) indicated that increased knowledge of a country reduces cost and uncertainty. Whilst the literature does not go so far as to make the direct connection between the existence of a manufacturing facility as being as an essential pre-cursor to adding an R&D facility, the theoretical frameworks do point to the importance of reputation, knowledge of a location and the success of the operation as being important to securing additional investment by MNCs. In the Irish context then, the existence of manufacturing plants can be seen as a significant influencing factor in the attraction of R&D investment. This clearly has been supported by the research findings from the depth-interviews where most respondents emphasised the importance of a successful manufacturing operation to securing future investment. This is of salient significance as this point directly supports our research aim.

4.3.3 Opinion as to the top three / five key factors influencing decisions by MNCs to invest in R&D facilities in Ireland

In response to this question, a number of opinions were offered by respondents as to the key factors that in their opinion influence MNCs in setting up an R&D facility in Ireland. The following list summarises the main factors as identified through the interviews,

- Skills Availability
- Competitiveness / Cost
- Governmental role
- Funding Incentives
- Academia Collaboration
- Role of Irish Management
- Role of Investment Development Agency

The literature also points to a number of factors that worked together to make Ireland an attractive location for FDI. These factors as described by

Hannigan, (2000) include labour availability, corporate taxation, skills availability, transport and telecommunication infrastructure.

Rather than bundle the findings from the interviews together, in the interests of clarity and to streamline these findings in relation to the academic literature, each of these factors will be assessed individually.

4.3.3.1 Skills Availability

Ireland has traditionally produced high quality and well trained engineers. Feedback from the depth interviews indicated that MNCs are keen to understand the local skill base in an economy and having the right people in control is seen as key to the success of the operation. Overall, it was felt that if you have the right people, the business will follow. In particular, the flexibility of Irish people in their work practices and approach was singled out as a key differentiator for Ireland. The need for a strong R&D leadership team with the capability to manage the strategic R&D agenda at a local plant was also seen as a key influencing factor.

“SUCCESS HAS BEEN DRIVEN BY IRISH PEOPLE.... I DON'T KNOW WHAT HAPPENED BUT IRISH PEOPLE STARTED TO BECOME MORE CONFIDENT IN THEMSELVES AND NOT AFRAID TO BE IRISH AND TO STAND-UP AND BE COUNTED”

“A KEY POINT WAS THE FLEXIBILITY AND LOYALTY OF THE IRISH ENGINEERS AS WELL AS A WILLINGNESS TO MOVE AROUND. FLEXIBILITY IS PART OF THE SPIRIT OF IRISH PEOPLE”

“WHAT ATTRACTED THE COMPANY INITIALLY WAS THE AVAILABILITY OF TALENT AT THE TIME”

“RELEVANT TO ITS SIZE, IRELAND HAS A HUGE POPULATION OF WELL EDUCATED PEOPLE... FROM AN EMPLOYEE BASE THAT IS GOOD.. IT IS A COUNTRY THAT RESPECTS THE VALUE OF EDUCATION”

“IRELAND OFFERS A WELL EDUCATED, YOUNG, COMPUTER LITERATE WORKFORCE”

“HAVING THE RIGHT QUALITY OF PEOPLE IS KEY”

“ONE OF THE KEY INFLUENCING FACTORS IS DEFINITELY THE SKILLS AND THAT IS THE REQUIRED SKILL AT PHD LEVEL.. MNCs NEED TO KNOW THAT THE SKILLS ARE HERE ON THE GROUND AND READY TO ROLL”

“BELIEVE ME, IF YOU HAVE REALLY TOP SCIENTISTS HERE, THE POST-GRADUATES WILL COME TO THEM BECAUSE THEY KNOW WHO THE BEST PEOPLE ARE IN THE WORLD”

Discussion

The importance of the availability of resources, and in particular labour, is widely acknowledged as influencing a firm's investment decisions in the FDI context (Moxon, 1975; Barry & Bradley, 1997). Affiliates with access to critical local sources of information and capabilities are better placed to garner influence on the strategic behaviour of the MNC than those without (Anderson *et al* 2001). Dunning (2000) noted that late twentieth century capitalism is knowledge based. Calliano (2000) makes reference to the fact that in advanced countries in particular, resources are related to knowledge and Anand and Kogut (1997) indicate that knowledge is partly embodied in the skills of the workers. The importance then of a country demonstrating that it can produce the right skill levels has been demonstrated by the research findings as being an influencing factor in attracting “knowledge-based” investment activities (R&D activity is primarily knowledge based) and this matches with the findings from the academic literature. However, the literature review did not specifically focus on the innate flexibility and adaptability of Irish workers as keenly emerged from the depth-interviews. This can be considered to be a new angle that develops previous research in this area and is of direct relevance to our research aim.

4.3.3.2 Competitiveness / Cost

The ongoing competitiveness of Ireland was highlighted by respondents as being an important and strategic factor in Ireland's onward progression to a knowledge based economy. The emphasis here was not just based on cost but also the critical role of productivity, quality, innovation, speed to market and overall up-skilling of the workforce together with the integration of imported skills and knowledge.

A notable feature of the respondents was the competitive threat of China and India and the expansion and development of the EU. In addition

concerns were expressed about the cost base especially in relation to property and utilities, such as energy and waste.

“WE MUST CONTINUE TO BE COST AWARE AND COMPETITIVE..... WHILE NOT FORGETTING THE LINK BETWEEN R&D AND COMMERCIALISATION”

THE RISING COST BASE IN IRELAND IS A CONCERN WE MUST ENSURE THAT WE MAINTAIN CONTROL OF COST AND PURSUE PRODUCTIVITY AND QUALITY ADVANCEMENTS.”

“IN TODAY’S MARKET PLACE AGILITY AND RESPONSIVENESS ARE CRITICAL SPEED TO MARKET CAN DETERMINE BETWEEN FAILURE AND SUCCESS IRELAND MUST ENSURE TO MAINTAIN AND FOSTER THIS ABILITY AND RESPONSIVENESS THOUGHT ONGOING UP-SKILLING AND LIFE LONG LEARNING.”

“IRELAND IS NO LONGER A CHEAP LOCATION, AS OUR SALARIES, LIFE STYLE AND PROPERTY COSTS HIGHLIGHT..... IT IS IMPETRATIVE THAT WE FOCUS ON KNOWLEDGE INTENSIVE ACTIVITIES SUCH AS R&D.”

“IN A SMALL REGIONAL ECONOMY LIKE IRELAND, ECONOMIC PROSPERITY ULTIMATELY DEPENDS ON OUR ABILITY TO SELL GOODS AND SERVICES ABROAD.”

“THE NATIONAL DEVELOPMENT PLAN (2007-2013) PROPOSES A WIDE RANGE OF INVESTMENTS THAT WILL ADVANCE IRELAND’S INFRASTRUCTURE, ENHANCE THE SKILLS OF THE LABOUR FORCE, AND IMPROVE THE BUSINESS ENVIRONMENT FOR RESEARCH AND INNOVATION”

Discussion

In Ireland over the period 2001 - 2006, per capita incomes have grown by 17%, thus Ireland is now on a par with the EU-15 and OECD averages.

Historian (Von Tunzelmann (1933) and Marthias (1969)) are generally in agreement that no single factor can explain a nations success, but rather the success can be attributed to a unique combination of interacting social, economic and technical changes within the national conditions.

As such, the role of government and its related agencies is critical in respect to strategic direction and related policy formulation, a view which is supported by List (1841) who put great emphasis on the role of the state on carrying through long term polices for industry and the economy.

In essence, the basis for the ongoing success of Ireland is dependent on the development and fostering of the respective stakeholder, which includes industry, educational and research institutes, which together with a focused governmental approach can support knowledge development and transfer. This view is supported by Chapman and Humphry's (1987) in that if demand is created at local level for expertise then opportunities both indigenous and FDI will follow.

4.3.3.3 Role of Government

The role that Government has played in shaping the economic policy and fortunes of Ireland was seen in the opinions of the respondents, as being of critical importance. The emphasis here was on the importance of ensuring that the right institutional frameworks are in place in order to make it easier to attract in R&D investment. Investing monies under the respective National Development Plans was seen as significant as was the establishment by Government of Science Foundation Ireland in 2000, with the specific remit of attracting R&D investment through supporting collaborative work between Universities and industry. The pro-activity of policy makers in managing the R&D agenda was applauded, although many respondent indicated that while this is a good start, as a nation we have a long way to go. Interestingly, ease of access to Government (through the operating arm of IDA Ireland) was lauded as a key factor, as bureaucratic burdens in other locations hampered decision making processes in relation to new investments.

“THE GOVERNMENT HAD A BIG PART TO PLAY WITH CHANGING THE WHOLE BUSINESS ENVIRONMENT IN IRELAND”

“IRELAND HAS A VERY PROACTIVE GOVERNMENT WHICH IS INVESTING MONIES IN R&D ACTIVITY. A PROACTIVE APPROACH TO NATIONAL POLICY IS INCREDIBLY IMPORTANT TO A COMPANY COMING IN. ESTABLISHING SCIENCE FOUNDATION IRELAND WAS A PARTICULAR COUP”

“THE LANDSCAPE IS CHANGING DUE TO DECISIONS MADE BY GOVERNMENT AND THE VARIOUS BODIES RESPONSIBLE FOR ATTRACTING INVESTMENT IN EUROPE... THERE SEEMS TO BE A NEW MIND-SET TOWARDS R&D THAT STARTED MAYBE FIVE OR SIX YEARS AGO”

“ONE OF OUR STRENGTHS IN ATTRACTING COMPANIES TO IRELAND IS OUR EASE OF ACCESS TO GOVERNMENT... THIS HAS BEEN UNDERPLAYED”

“PRO-ACTIVITY AND ACCESSIBILITY TO GOVERNMENT IS KEY. THIS EASES THE APPROVAL PROCESS FOR GRANT-AID”

4.3.3.4 Funding Incentives

Significantly, opinion varied amongst respondents as to the level of influence that financial incentives can have in securing R&D investment to Ireland. Some respondents were quite approving of the funding mechanisms available to companies, and in particular, the funding provided by Science Foundation Ireland for specific research activities with Universities. Any funding which can reduce the initial investment pain, particularly for start-up operations, was lauded. However, a number of opinions negated the value of remunerating companies through grant aid as a mechanism to encourage them to invest in R&D facilities in Ireland. For some, the overriding business case had to be there in the first place, before any investment decision could proceed and grant-aid was not seen as something that could of itself drive a business decision of this nature. The provision of funding incentives was by and large seen as a “sweetner” and “icing on the cake”, once the decision had been made to come to Ireland. More tangible indirect supports like the creation of an easier R&D tax credit system and the guarantee of securing a low corporation tax rate were seen as more significant business drivers.

“MONEY IS ALWAYS NUMBER ONE FOR A COMPANY...FINANCIAL INCENTIVES REALLY CAN WORK, ESPECIALLY WHERE R&D EXPENDITURE IS REDUCING ELSEWHERE... RATHER THAN LOSE THE ACTIVITY TOTALLY THEY CAN PUT THE R&D UNIT IN IRELAND. THIS IS A PLUS FOR US”

“ANYTHING THAT CUTS THE INITIAL BURDEN OF STARTING TO DO BUSINESS HERE IS VERY USEFUL”

“ANY PLACE IN THE WORLD CAN OFFER YOU A BLANK CHEQUE.. YOU NEED THE ACTUAL BRAIN POWER IN HUMAN CAPITA TO DEVELOP NEW FORMS OF INTELLECTUAL PROPERTY AND TO BE INNOVATIVE”

“IF SOMEBODY WANTS TO SET SOMETHING UP THEY WILL DO IT WITH OR WITHOUT GRANT AID... THE WHOLE CORPORATE BUSINESS CASE DRIVING IT HAS TO BE THERE”

“PRACTICAL ASSISTANCE LIKE AN EASIER TAX CREDIT, LIKE MORE SUPPORT IN THE NUMBER OF RESEARCHERS, MORE OF WHAT IDA AND SCIENCE FOUNDATION IRELAND ARE DOING IN TERMS OF GROUND SUPPORT FOR INVESTMENT”

“SFI ARE ATTRACTING A LOT OF WORLD-CLASS RESEARCHERS THROUGH THE UNIVERSITIES... OBVIOUSLY FUNDING HAS A HUGE PART TO PLAY AS WELL”

“THE COMPANY WERE VERY AGGRESSIVE IN ENSURING THAT THEY GOT THE RIGHT LEVEL OF FUNDING BEFORE AGREEING TO PROCEED”

“WE GOT GRANT AID UPFRONT FROM THE IDA AND IT HELPED BUT IT IS NOT THE THING THAT WILL SWING YOU TO LOCATE HERE... IT'S A NICE THING TO THROW IN... A SWEETNER REALLY”

“IDA GRANTS ARE TOO SMALL AND REALLY ARE ONLY ICING ON THE CAKE ONCE YOU DECIDE TO COME TO IRELAND”

“THINGS LIKE THE TAX REGIME IN IRELAND AND THE LOW CORPORATE TAX RATE ARE VERY ATTRACTIVE TO CORPORATIONS AS WELL AS THE TAX RELIEF ON LICENSE REVENUE FROM IRISH INTELLECTUAL PROPERTY.. THIS IS A SIGNIFICANT PART OF OUR REVENUE STREAM”

Discussion

The literature review by and large converged with the principal findings from the depth-interviews, that financial assistance is not considered to be an over-arching influencing factor. Grant aid is seen as having relatively little impact on location choice (Batchler & Clement, 1990; Tatoglu & Glaister, 1998). Gilmore *et al* (2003) noted that FDI can be quite shallow and therefore transient if the investors are merely attracted by financials rather than such fundamentals as skilled labour. Some authors however pointed to grant incentives as an important factor when added to other variables (O'Malley & O'Gorman (2001). Hannigan (2000) indicated however that the low rate of corporation tax of 12.5 per cent has been an important factor overall in accounting for investment decisions to locate an operation in Ireland – a view supported by Gilmore *et al* (2003).

Direct financial assistance then in the form of grant aid for R&D activities is not seen as a key influencing factor for companies looking to set up R&D facilities in Ireland. This emerged from the research findings and was supported overall by the findings from the academic literature. It

would be fair to infer however that where the business case has been justified for investment, financial incentives are most likely to be welcomed.

4.3.3.5 Academia Collaboration

A high percentage of respondents expressed a view that stronger interactive and partnership models, which were user friendly, were required between industry and academia.

The feedback from the interviews broadly recognised that there is a large body of excellent research been undertaken across the various academia institutes, but in the view of the interviewees, a large percentage of this research lacked a focus toward commercialisation or general industrial use.

Also as previously mentioned the work of Science Foundation Ireland (SFI) is certainly welcomed and supported but there remains the missing link within the minds of the interviewees regarding sustainability of the respective research personnel post the current cycle of SFI funding and the related transfer of knowledge from the SFI programmes into their respective business sectors.

“I HAVE NO DOUBT THAT THE UNIVERSITIES ARE DOING SOME GOOD RESEARCH, BUT I FIND IT DIFFICULT TO MAP A ROADMAP FROM THE UNIVERSITY LAB INTO AN INDUSTRIAL ENVIRONMENT”

“WE HAVE ENGAGED WITH A NUMBER OF UNIVERSITIES AND IT’S OVER THE YEARS AND SOME ARE HARDER TO WORK WITH THAN OTHERS..... THERE NEEDS TO BE A CONSENSUS OVER HOW IP IS MANAGED”

“I HAVE USED THE LOCAL ITC IN INNOVATION PARTNERSHIP PROGRAMMES AND OVERALL THE PROJECTS HAVE BEEN VERY SUCCESSFUL.....WE WILL CERTAINLY BE DOING ANOTHER PROJECT IN THE FUTURE”

“THE ESTABLISHMENT AND FUNDING OF SFI IS THE CORRECT STRATEGY AS IT PLACES IRELAND ON THE INTERNATIONAL STAGE FOR RESEARCH AND INNOVATION..... THERE IS A NEED HOWEVER TO DEVELOP AND IMPLEMENT A STRATEGY OF TRANSFERRING THE KNOWLEDGE GAINED FROM THE SFI PROGRAMMES INTO LONG-TERM COMPETENCY AND RELATED NEW PRODUCTS OR SERVICES”

“EVERYONE NEEDS TO BE ON THE SAME PAGE.... ALL RESEARCH MUST RESULT IN A NEW OR ADVANCED PRODUCT OR SERVICE IT MUST HAVE AN END COMMERCIAL IMPACT”

Discussion

A successful innovation system or culture does not develop or prosper in isolation. In Ireland the ongoing development of the Irish innovation system matches with that of the Triple Helix model as proposed by Etzkowitz and Leydesdorff (1998) and Viale and Etzkowitz (2005), where knowledge surpasses organisational boundaries as university, industry and government enter into a reciprocal relationship in which each attempts to enhance the performance of the other.

This paradigm shift toward the concept of Open Innovation as described by Chesborough (2003) highlights the significance of how knowledge and expertise has become diffused among companies, suppliers and universities. It is no longer a necessity for an organisation to rely on internal knowledge and expertise but competitive advantage can be achieved through embracing external sources of knowledge and innovation. An advocate of the open innovation strategy is Procter & Gamble, whom credit one third of the company's innovation as a direct result of the open innovation strategy deployed.

In Ireland these various linkages are at different level of development as was apparent from the various responses from the interviews. The more advance companies are pro-actively developing relationship outside the company structure which others remain in the closed innovation pattern of inward focus. While there are expression of concern around the management of the relationship between industry and academia overall the view is that Ireland's innovation system is evolving towards an open innovation model.

4.3.3.6 Role of Irish Management

Interestingly, ninety percent of respondents indicated that it was their belief that Irish managers played a crucial part in securing R&D investment into Ireland.

Irish managers are typically, but not exclusively, employed by MNCs to manage the Irish operation of the foreign-owned entity. Feedback from the depth-interviews revealed that management, especially senior management, initially take on board the basic operational mandate for the entity. Thereafter, with intra-organisational global competition for projects, management seek to secure additional investment by offering to compete on Global and or European tenders. Some companies were established in Ireland with a specific R&D mandate and some of the interviewees were employees of these operations. However, other interviewees were employed by companies who were established with a traditional and exclusive manufacturing mandate but which subsequently gained responsibility for small-scale development work. Once this development work was seen in the eyes of corporate to be working and more importantly, creating revenue, formal responsibility for increased mandates in the R&D area were rewarded to the Irish site. Most interviewees made reference to the operation of “skunk work” activities at Irish plants as being the crucial strategy to securing R&D investment. Typically, the operation, usually with a sole manufacturing remit dips into development work without the knowledge of the parent corporation. Led by senior engineers or technicians and supported by management, the operation builds up a capability in a technical area to a certain level of maturity. Once at that stage, it becomes possible to demonstrate the enhanced capabilities at the plant to the “right people” at parent company headquarters. Provided there is a corporate business need, the feedback indicated that the usual net result is the awarding of the R&D remit to Ireland. Feedback indicated that success in this regard is determined by the work of “key influencers and leaders” at Irish plants, many of whom sit on global boards where the “voice of Ireland” can be heard. Many existing managers of Irish plants have previously worked in the US for large

corporations and understand the mechanics, the politics and the business case analysis for how global projects are awarded.

“LETS FACE IT... THE GENETIC INGREDIENT IS THAT WE ALL WANT THIS SITE TO BE AROUND FOR OUR CHILDREN. IF THAT DOES'NT EXIST IT IS VERY DIFFICULT”

“THE ATTITUDE AMONG IRISH MANAGERS IS BY GOD I AM GOING TO LOOK AFTER THE HOME-FIRES. THEY DON'T TEACH YOU THAT IN BUSINESS SCHOOL”

“NONE OF THE R&D ACTIVITY IN IRELAND WOULD HAVE HAPPENED WITHOUT GOOD IRISH MANAGEMENT TEAM BACKING, SO THIS HAS BEEN A CRITICAL SUCCESS FACTOR FOR IRELAND”

“COMPANIES ARE DOING SOMETHING HERE THAT THEY DON'T WANT TO DO NATURALLY SO IT HAS TO BE DRIVEN BY THE USE OF SKUNK WORKS... WHERE THERE IS UNOFFICIAL R&D”

“SKUNK WORKS ARE NECESSARY IN TERMS OF DEVELOPING A STRATEGIC RELATIONSHIP WITH KEY LEADERS AND INFLUENCERS.. THIS MAKES FOR A VERY NICE FORMULA”

“I THINK IT WAS BASICALLY THE REALISATION OF IRISH MANAGEMENT THAT THEY WERE NOT GOING TO BE THERE IN THE LONG-TERM TO SUSTAIN THE IRISH OPERATION UNLESS THEY INVESTED IN R&D ACTIVITIES”

“SUCCESS AT A BASIC LEVEL WAS PROBABLY BECAUSE OF IRISH MANAGEMENT RAISING THE IRISH FLAG AT US CORPORATE LEVEL AND DOING THAT IN COLLABORATION WITH IDA IRELAND EXECUTIVES”

“LOCAL MANAGEMENT IN IRELAND WERE ON THE SAME HYMN SHEET REGARDING THE KEY STRATEGIC AGENDA IN TRYING TO SECURE X COMPANY TO INVEST IN AN R&D FACILITY IN IRELAND”

Discussion

Most authors have chosen to bunch together an array of shopping-list factors for explaining the attractiveness of Ireland as a location for FDI. Whilst this was useful in providing leading themes, it does not lead one to specifics. The influencing role of Irish management has however been reviewed in the overall context of the development of an FDI base in Ireland, and in particular in the literature as it relates to affiliate evolution. Within the industry, individual affiliates must react to growing competition from external producers and service providers as well as continuous restructuring within the corporation (Hochtberger *et al* 2004). The manner in which affiliates evolve and develop influences greatly inward investments potential for value-creation, enhancement and capture. The framework put forward by scholars examining Global Production

Networks begins to take account of some of these issues. These challenges mean that affiliate managers must constantly defend and enhance their corporate charter and subversive affiliate management teams are most likely to succeed (Molloy and Delany, 1998). The pace of technological change now requires the development of “fast managerial subjects” capable of coping with permanent emergency in order to ensure the survival of their affiliate (Thrift, 2000). The contemporary corporation involves a mix of competition and collaboration, with different interest groups focusing their efforts on their own strategies and agendas. Within the boundaries of corporate governance, decentralised decision-making can afford affiliate managers the necessary autonomy to pursue initiatives that primarily benefit their individual affiliate. Proposals put forward by affiliate managers are often evaluated more on the qualities of the individual putting them in than on their technical merits (Birkinshaw and Hood, 1998). Research taken in the context of territorial innovation models assigns great importance to these informal personal relations (Lagendijk, 2003). Intra-firm relations demonstrate that the scope of these relations are not restricted to the local scale, but rather operate on a multitude of socially constructed, organisational scales (Bunnell & Coe, 2001). Affiliate driven capability enhancement then involves local managers making strategic moves to build their capabilities and to expand their mandate (Hochtberger *et al* 2004).

Clearly, the level of influence that a local management team can have on the parent company is a critical success factor in attracting FDI to Ireland. This is apparent from the research findings and can be seen as supported by the literature as it relates to affiliate evolution. The literature however does not go so far as to relate the role that Irish management played in the specific attraction of R&D investment – discussing FDI only in more general terms. Given the feedback from the depth-interviews in relation to the role that management can play in the attraction of R&D investment, we can take this information as building on the research work in this area and as adding new academic thought.

4.3.3.7 Role of Investment Development Agency

IDA Ireland is the Government agency responsible for attracting FDI. Feedback from the depth-interviews was very positive overall in relation to the role that IDA has played in the attraction of FDI. Pro-activity, networking and professionalism were, in particular, referenced as laudatory characteristics of employees of the organisation. The role of IDA in working with existing operations to attract in additional activities was welcomed. Specifically, the approach used by IDA Ireland in show-casing existing companies as reference sell models for new companies coming into Ireland, was seen as very positive. Responses however, tended overall to be linked to more generic FDI and did not specifically lean towards success in attracting investment in R&D activities.

“WE FOUND IDA TO BE VERY USEFUL... OBVIOUSLY THERE IS THE FINANCIAL SIDE BUT ALSO THE NETWORKING SIDE WHICH IS SOMETHING THE IRISH ARE OLYMPIC CHAMPIONS AT...”

“IDA WERE VERY PROACTIVE ON ORGANISING THE RIGHT MEETINGS FOR US... THIS SAVED US A LOT OF EFFORT AND PAIN”

“EVERYONE FROM IDA HAS PUT IN A HUGE EFFORT OVER THE YEARS AND A FANTASTIC JOB HAS BEEN DONE FOR IRELAND”

“ALL OF THE PEOPLE WE MET FROM IDA WERE VERY PROFESSIONAL AND VERY EASY TO GET ON WITH... THAT IS A VERY STRONG ASSET AND BECAUSE YOU REPRESENT IRELAND OVERSEAS THAT IS REALLY POSITIVE”

“IT’S A CREDIT TO YOUR IDA COLLEAGUES THAT IT WAS ALL MADE VERY STRAIGHTFORWARD.. YOU HAVE A VERY STRONG CAN-DO ATTITUDE”

“THE NO-NONSENSE APPROACH BY IDA AND THE MINIMISATION OF ADMINISTRATIVE HOOPS MADE EVERYTHING REALLY STRAIGHT FORWARD FOR US... THAT WORKED REALLY WELL AND CREATED MANY ADVANTAGES”

“THE LAST THING WE NEEDED WAS TO SET UP AN OPERATION THAT INVOLVED LOADS OF BARRIERS AND HURDLES. IDA CLEARED THE PATH FOR US IN THIS REGARD”

“IDA WOULD OBVIOUSLY HAVE HAD A BIG PART IN THE SUCCESSFUL PROMOTION OF IRELAND”

Discussion

The role of a development agency in the promotion of a location for FDI has received much comment in the academic literature. White (2003) indicated that local agencies are geared to deepen firm embeddedness by supporting affiliates in their drive to upgrade and develop their internal capacity. O'Higgins (2002) in her model of the flexible developmental state, indicated that the long history of FDI provided a learning medium for IDA and companies who worked together over the years to expand the value derived from the FDI experience. She also made reference to the skills, personalities and insights of the people of IDA, including an in-depth understanding of client needs and the foresight to identify and pursue opportunities ahead of time, as critical in the development of a successful FDI base in Ireland. Proponents of "new regionalism" literature (e.g. Amin, 1999; Cooke and Morgan, 1998) indicate that firms may enhance their capabilities by connecting to local institutions like development agencies. Hochtberger (2004) and Young *et al* (2004) indicated that local development agencies attempt to assist the development of locally based affiliates through the provision of aftercare services. Aftercare programs can often involve customised infrastructure, grants and even efforts to lobby MNC HQs on behalf of the local affiliate (Fuller *et al.*, 2003).

Since inception, IDA Ireland has played a key role in chartering the economic fortunes of Ireland through the implementation of impressive strategies to attract FDI. The role of the development agency in attracting investment should not be under-rated. However, based on the feedback from the depth-interviews, it is difficult in this instance to specifically match the influence of IDA Ireland and the specific attraction of R&D type investment. What is clear is that IDA as a development agency, has had a part to play in securing investment to Ireland. Academic comment indicates that only rarely can such efforts like lobbying and aftercare programs by agencies influence firm investment decisions (Mackinnon & Phelps, 2001; Fuller *et al.*, 2003). The extent to which aftercare and other

forms of stakeholder intervention actually enhances the regional development potential of inward investment remains subject to debate (Lovering, 1999; Rodriguez-Rose and Arbix, 2001). For the purposes of this research then, it is possible to infer that IDA Ireland has acted as an influencer in the attraction of FDI to Ireland and that the agency has a strong role in the attraction of R&D investment to Ireland.

4.4 Summary

The principal findings and analyse as presented from the in-depth interviews matches with the main influencing themes which emerged from the literature review. These themes are as presented at the beginning of section 4.3. A correlation between the literature themes and the findings from the in-depth interviews includes the following influencing factors;

- Educational system
- Labour skills
- Government Policy
- Past experience of host locations
- Financial Incentives

However, the in-depth interviews uncovered a new perspective that of the influencing role which is played by the existing Irish management team which coupled with the positive influence that an existing manufacturing mandate has in securing and winning R&D investment.

CHAPTER 5

METHODOLOGICAL CRITIQUE

5.0 Methodological Critique

“Just as energy is the basis of life itself, and ideas the source of innovation, so is innovation the vital spark of all human change, improvement and progress”.

Theodore Levitt

5.1 Introduction

A critical reflection on the methodological approach allows the author to focus objectively on the outcomes of the research in context. Given the exploratory nature of the research and the interpretivist approach taken the in-depth interviews was picked as an appropriate method for conducting the data collection. This interpretivist approach legitimises the value and weight of individual belief and conviction – it is the individual who decides, who interprets, who makes measurements (Jankowicz, 2002)

The focused research aim required the author to get inside the skin of respondents to understand their view of the world. Given the strands that emerged from the literature review, this helped guide the approach to the data analysis where grounded theory was usefully explored in the development of principal themes. This section will assess these methods and resulting outcomes in the light of the research aim and objectives.

5.2 Grounded Theory

Glaser and Strauss’s aim with this approach was to maximise what they termed the researchers “theoretical sensitivity” – his or her ability to “conceptualise and formulate a theory as it emerges from the data”. This is done by proving a framework or discipline for building narrow categories (substantive theories) into more abstract (formal) theories. Grounded theory is an essential tool for looking for the robustness of qualitative evidence (Smith & Fletcher, 2003) and was most usefully employed here in the analysis of the research findings. It works by collecting the data, generalising findings into statements and checking the

plausibility of these categories. The theory is said to emerge by deduction from the realities of the situation (Jankowicz, 2002).

Each individual transcript was first read, then coded and themed according to strands as developed from the academic literature. Observations from the author and field-notes made during the interviews were added in as supplementary information to match with the themes. As an approach, using grounded theory allowed the author to holistically develop the research findings and to mould them according to definitive themes. Equally, where new themes emerged (e.g. specific role of Irish management) a new “theme” was created which was then built on.

Grounded theory has become a recognised rationale for qualitative research and it provides a standard justification that can fend off potential criticism from those who might otherwise question the rigour of small-scale research (Denscombe, 2003). It is a fairly adaptable approach in that it lends itself to a variety of qualitative data collection methods, including the two methods used here. In this instance, the use of the approach permitted a degree of flexibility in both the selection of instances for inclusion and the analysis of data – both of which are suited to the exploration of new ideas and topics. More negatively Denscombe, (2003) notes however that there is a tendency to divorce the explanation of the situation being studied from broader contextual issues. The author therefore had to keep this in mind when analysing the results. The need to approach things with an open mind is a fundamental principle of the grounded theory approach, but in practice, it raises some questions, mainly because the researcher is influenced by their own culture and personal experience. The author, as an employee of IDA Ireland and as someone who is familiar with the investment landscape for FDI in Ireland was already familiar with the notion of investment decision making in the FDI context. Technically, this could be seen as creating an inherent bias in the research process. Overall however, the author being familiar with the limitations of grounded theory as an approach to data analysis attempted to restrict bias as far as possible. Overall, although time-consuming and at

times unstructured, the approach to analysing the research results using grounded theory was seen to be beneficial to the nature and type of the exploratory research findings.

5.3 Depth Interviews

In this instance, an unstructured approach was taken to the management of the depth-interviews, with guidance on the themed questions developed largely from the research objectives and literature review. Using this approach, allowed the respondents to demonstrate their unique ways of defining the world (Denzin, 1970). Interviewees were encouraged to tell their stories and to offer their own definitions of particular activities (Silverman, 1993). The researcher attempted to develop a rapport during the interviews to allow opinions, feelings and meanings to be demonstrated (Evans *et al* 2001). Kvale (1996) indicated that the interviewer should be conscious of the interpersonal dynamics within the interaction and take them into account in the interview situation and later on in the analysis stage. Moutinho & Evans (1992) state that the main types of error and bias which can occur during the data collection, can be due to poor interviewing or observation procedures.

Given the awareness of the academic literature on the management of depth-interviews, the author attempted as far as possible to follow best-practice guidelines for ensuring that all interviews were properly planned, researched and effectively managed. Despite having the theoretical knowledge on effective interviewing technique, practice proved to be a good teacher. The interviews had to be managed for conversation flow as interviewees at times tended to digress from the suggested topics into areas of their own preference. In some instances, it was obvious that the recording of the conversation caused some discomfort and in one instance the recorder had to be turned off. This meant that the author had to take notes in addition to managing a conversation which was a distraction. Four interviews were conducted by telephone as it was not possible to meet up with the individuals face-to-face. Even though the recorded conversations

still provided some key insights, obviously the ability to make observations was removed as well as the personal one-to-one engagement.

Chapter 6

Conclusions & Recommendations

6.0 Conclusions & Recommendations

6.1 Global Innovation Networks

Porter (1990) argues that future battles for competitiveness will not just be fought between organisations but between nations.

The extent and character of trends towards the internationalisation and globalisation of innovative activities have been the subjects of lively debates (Ramirez, 2003). Pavel and Pavitt (1999) for example conceptualised the notion of the “globalisation of innovation” as the percentage of R&D activities performed by firms outside their country of origin. A further stream of research has focused on the growth of cross-border technological collaborations as evidence of the growing globalisation of innovation (Mytelka 1991, Hagedorn, 1994, Miotti and Sachwald, 2003). The rise of international inter and intra-firm R&D networks are therefore at the heart of this conceptualisation of global innovation (Dunning, 1997). Though the majority of firms’ R&D activities continue to be located in their country of origin, MNCs are globalising their innovative efforts through open innovation structures and by developing an international division of labour between geographically dispersed research sites (Chesborough, 2003; Cantwell, 1995; Pearse and Singh, 1992). At the same time, a number of industries have seen a qualitative increase in the number of cross-border technological alliances (Hagedoorn, 1995).

Golden *et al* (2003) indicate that one way to be more competitive is to be innovative. Nelson (1993) directly addresses the innovativeness of nations using the concept of National Systems of Innovation (NSI). These are defined as “ a set of institutions whose interactions determine the innovative performance of national firms”. The main premise of this concept is that innovation is central to competitiveness, and the key driver of innovation is knowledge, “the most fundamental resource in the modern economy” (Lundvall, 1992). Research & Development activities are seen as the

drivers of innovative processes and fundamentally “knowledge” based economies. Establishing a strong R&D base is critical for driving successful economic longevity for most countries in the developed, and increasingly developing worlds. The nature of FDI is changing as globalisation and the inherent development of intra and inter-firm alliances reduces the global playing field to fewer and increasingly dispersed locations. It is in this context and against this background that this thesis sought to explore the factors influencing decisions by MNCs to establish R&D facilities in Ireland.

6.2 Links With Academic Literature

A review of the academic literature as it relates to the nature of FDI in the Irish context proved interesting. A number of reasons and factors were presented by different authors as explanations for the attractiveness of Ireland as an investment location. Many authors drew considerably on the economic boost that the Republic enjoyed during the Celtic Tiger years where a pro-investment culture was built around the increased economic and social prosperity. This they indicated, helped create a milieu that acted as a honey-pot for multi-nationals seeking a European headquarters location. What became evident from the literature review, and as demonstrated in the analysis of the results section, is that there was very little concurrence amongst authors as to the salient factors that;

- 1) Influence MNCs to invest in Ireland

- 2) Make Ireland an attractive location for FDI.

Equally, the attractiveness of Ireland specifically as a location for R&D investment was not in the main addressed, authors preferring to address the success of Ireland overall as a location for FDI. The gaps as identified in the literature review provided an opportunity for a more focused approach and iterative process to the development of the research question and to the methodologies and analysis employed in conducting the primary research.

6.3 Comments On Primary Research Findings

The results from the depth-interviews were revealing. Initial feedback from the interviews indicated that a number of factors conspire to make Ireland an attractive location for R&D investment – these factors ranged from skills of workers to University networks etc. The principle factors relating to the attractiveness of Ireland as an investment location for R&D were not dissimilar to the factors espoused by the academics on the attractiveness of Ireland as an investment location for FDI more generally.

Significantly however, an analysis of the feedback from the depth-interviews revealed other factors that have played a more influencing role in the attraction of MNCs to Ireland for R&D namely;

- 1) Role of Irish Management
- 2) Existence of a manufacturing facility as a pre-cursor to securing an R&D facility
- 3) Flexibility of Irish workforce.

These factors did not succinctly emerge from an analysis of the academic literature. The discussion and analysis of the results demonstrated the importance that these key stake-holders attached to these particular factors as key influencers. Given this feedback, the author feels that the results from the academic research have contributed to the academic advancement of thought in this area. As Hochtberger *et al* (2003) noted “a web of extensive international relationships and global interdependencies are equally central determinants of today’s firms’ economic performance and spatiotemporal behaviour”. An affiliates degree of autonomy profoundly determines a unit’s potential to develop external local networks and – as recent work of e.g. Zanfei (2000) or Anderson *et al* (2001) has shown – is subject to both internal corporate interdependencies and the potential resulting from the local milieu. New regionalism literature conceptualises the notion of “localised capabilities” (Maskell & Malmberg, 1999), “regional innovation systems” (Cooke and Morgan, 1998) and “untraded

interdependencies” (Storper, 1997). Partly based on Granovetter’s (1985) work in economic sociology, they all stress the distinctive role of embeddedness of economic action within social and political practices. The research question then can be deemed to have been addressed in that the author has undertaken an exploratory investigation into the factors influencing the decisions by MNCs to invest in R&D facilities in Ireland.

6.4 Recommendations For Future Research

A number of areas could be looked at and considered in order to significantly advance the research in this area. Whilst the depth-interview were usefully employed as data collection methods, it is felt that these could be used more strategically if time constraints and resources were not an issue. For example, the number of depth-interviews could be increased to forty, to include twenty companies who already have an R&D facility in Ireland and twenty companies based in overseas markets who are potentially looking at new overseas markets for R&D functions. In addition, the establishment of a dedicated focus groups could be facilitated in both Ireland and overseas territories. Use could be made of the IDA Ireland overseas network to tap into prospects and indeed IDA staff who are considerably closer to important decision makers at US and Asian Corporate Headquarters. This study focused on existing companies operating across the Life Science, ICT and Engineering sectors thus provided a holistic view of the investment landscape in Ireland for R&D activities. Equally, the author feels that this work could be further advanced by the completion of a comparative study between Ireland and another country or countries across a global competitiveness matrix for R&D investment. More use could be made of the application of the case study technique in future research as a tool to triangulate findings from primary research in particular. A number of authors made use of this approach, and where applied successfully, the findings are usually quite informative. Case studies whilst typically reflective of a snap-shot in time, can be undertaken for longer periods to chart individual company developments.

6.5 Implications For Policy Makers

The success of Ireland as a location for FDI has long been fêted. Economic commentators have more recently indicated however that the Irish model is reaching maturity and as such needs to be refreshed in order to continue to excel and to compete globally for FDI. The Irish Government has, through the establishment of Science Foundation Ireland and the continued implementation of the respective National Development Plans, put the building blocks in place for the creation of an environment where the R&D activities of MNCs are welcomed and encouraged to thrive. The Strategic for Science Technology and Innovation 2006-2013 vision is that “Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using knowledge for economic and social progress, within an innovation driven culture”.

However, strategic R&D agenda is not driven by accident, nor alone be driven by Irish management or by the success of existing manufacturing operations. The traditional “Father & Son” (US Corporate: Irish Operation) or skunk works approach to securing additional investment to Ireland has become jaded and is not a competitive strategy for securing either enduring or first class FDI in R&D. To be a technology leader in the R&D space we must be able to relate peer-to-peer to overseas investors on our merits alone. The future of the Irish economy rests on the creation of jobs where human capita is the highest input factor. In order to secure this future, policy makers must ensure that the institutional frameworks are in place to professionally support an R&D ecosystem which will act as a beacon to attract world-class academic and industrial investment projects. Our education system must produce the best engineers. Our cost base must remain competitive in order to allow Ireland to compete for global not just European R&D investment. The increasing mobility of FDI is alarming as globalisation and the dis-aggregation of value-chains continues and new locations become the “new Ireland” and the global darling of FDI best practice. Ireland still retains a unique selling proposition for FDI which must continue to be exploited – that of

experience. Despite the maturity of the FDI model, Ireland has over many decades built up a strong FDI base and with it the inherent management skills, it possess the ability to chart the economy through to achieving the holy grail of sustainable higher-value investment. The attraction of knowledge-centric employment opportunities will lead this growth and the promotion of Ireland as a world-class location for R&D investment should be pursued by academics, Government bodies and policy makers alike.

Appendices

Appendix	1	Irelands economy performance
Appendix	2	Forrester Wave™ Transformer chart
Appendix	3	Model of Flexible Developmental State
Appendix	4	Depth-Interview Themes
Appendix	5	Role of Agencies
Appendix	6	Irelands - Global Rating Index
Appendix	7	IDA Ireland Economic Indicators 2006
Appendix	8	Total IDA Employment by Industry Sector
Appendix	9	Forfas Publication on R&D Performance

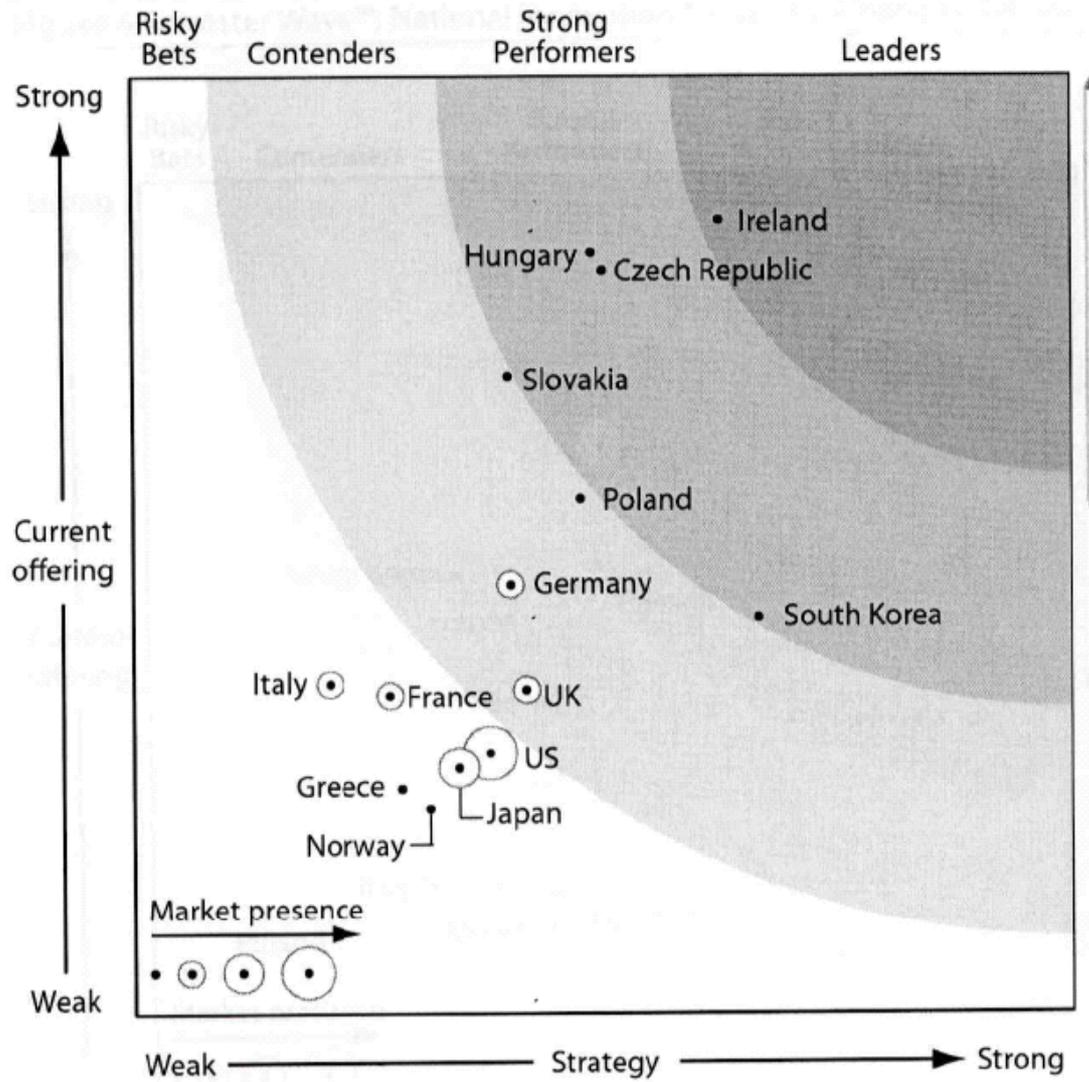
2005/6

Ireland's Economy Performance
Appendix 1

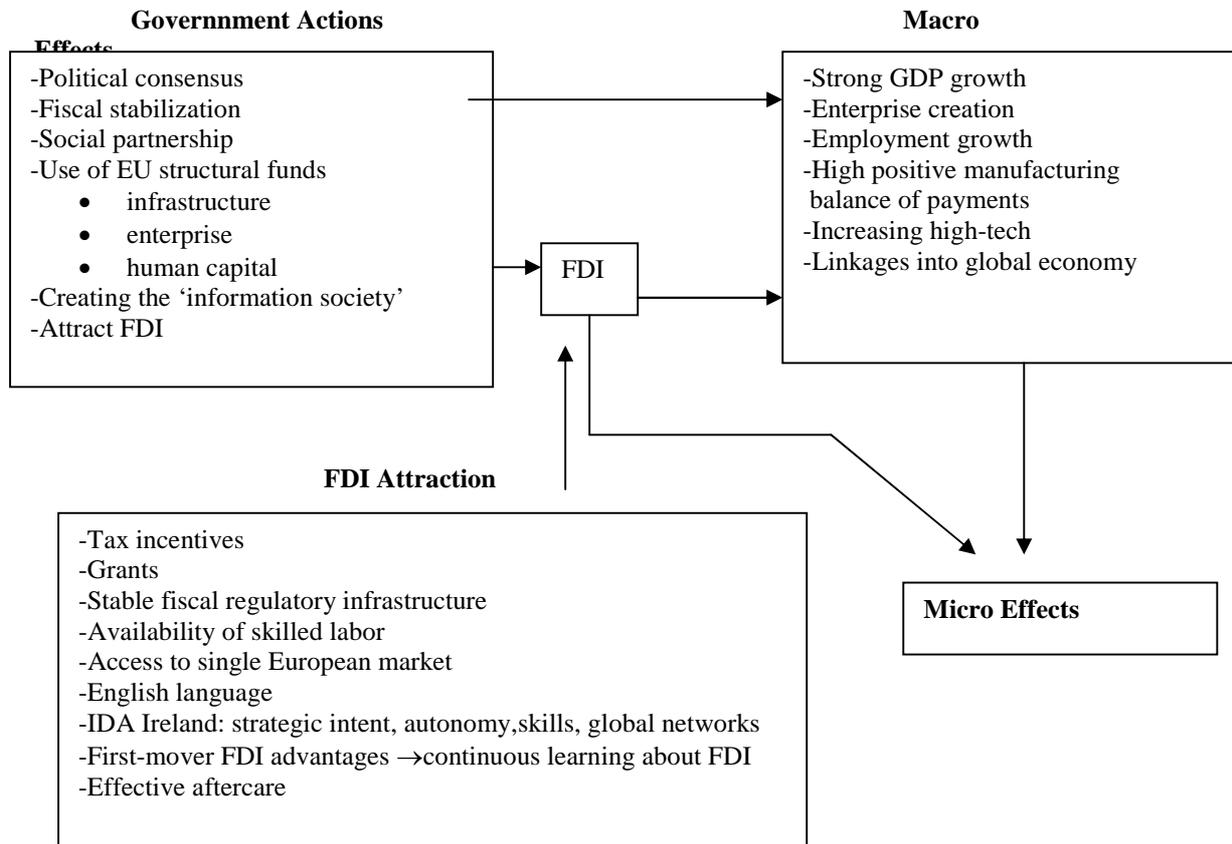
	1990	2006	Increase/Decrease
Population	3,53 million	4.23 million	+19%
GDP €b	36.312	176.4	+385%
GDP per capita €	10,357	33,277	+221%
Merchandise exports	€18bn	€91.3bn	+407%
Total Debt GDP	96.4%	22.8%	-73.6%
Total Labour Force	1.310m	2.11m	+61%
Unemployment	176,000	91,400	-48%
Unemployment	13%	4.4%	-8.6%

Appendix 2

Forrester Wave™: National Innovation Networks: Transformer



The Flexible Developmental State
Appendix 3



O'Higgins, 2002

Guide To Depth Interviews

Interview to be conducted on interviewee site or if not, at most convenient location for interviewee

Interviews to last for 1 hour max

Pre-briefing information to be sent to each participant by e-mail or by letter if e-contact is unavailable

Interviews to be recorded on micro-cassette and transcribed for coding/analysis purposes

Name	
Company Name	
Job Title	
Venue	
Age	
Sex	
Nationality	
Length of time with company	
Number of roles in organisation since joining	
Member of management team?	

Introduction

- Purpose of interview to be outlined
- Pre-briefing material to be referred to
- Request for permission to have the interview session recorded
- Assurance of confidentiality – the interviewee will be informed that information or comments provided will be for the original purpose as stated in the pre-briefing material and will not be inappropriately reproduced or disclosed to 3rd parties.
- Indicate that an open, free-flowing discussion is likely

Questions

Theme 1: Ireland & General Economic Performance

How would you describe the current global economic climate?

How do you feel Ireland is currently performing in economic terms?

What, in your opinion spawned the Celtic Tiger and is it still alive?

What do you think were the implications of the Celtic Tiger for Ireland?

What do you think of the current levels of Foreign Direct Investment into Ireland?

Theme 2: Ireland & FDI Investment In R&D

How would you describe the investment landscape for R&D in Ireland at the moment?

How would you rate the attractiveness of Ireland as an investment location for R&D? (1= Poor, 5 = Excellent)

What key factors do you think influence the decisions made by MNCs to invest in R&D facilities in Ireland?

Do you think that having an existing manufacturing facility in Ireland could play a role in attracting a subsequent R&D function?

What role do you think Irish General Managers working in MNCs play in attracting R&D investment into Ireland?

What do you think of the current incentives schemes available to companies who seek to invest in R&D facilities in Ireland?

What countries is Ireland competing with for R&D investment by MNCs?

What level of investment do you think Ireland needs to secure in R&D activities?

What policy changes could be made to make it easier for companies to invest in R&D activities in Ireland?

What challenges does Ireland face in attracting R&D investment now and for the future?

Theme 3: R&D Investment & Role of IDA Ireland

What type of R&D investment do you think IDA Ireland should be seeking to attract to Ireland?

What do you think of the role IDA Ireland plays in securing R&D investment into Ireland?

What do you think of the marketing efforts made by IDA Ireland in securing FDI into Ireland?

Theme 4: Ireland, Education & R&D

What do you think of the role of third level institutions in Ireland in helping promote and develop a culture of innovation?

What role has the secondary education system played in preparing an appropriate technical and engineering skills base for a knowledge-led economy?

Theme 5: Ireland & The Future Investment Landscape For R&D

Do you think Ireland could become a global cluster for R&D development for your sector?

Role of Agencies

IDA Ireland

IDA Ireland (Industrial Development Agency) is an Irish Government agency with responsibility for securing new investment from overseas in manufacturing and internationally traded services sectors. It also encourages existing investors to expand and develop their businesses. Over 1,050 overseas companies have chosen Ireland as their European base and are involved in a wide range of activities in sectors as diverse as [e-Business](#), [engineering](#), [information communications technologies](#), [pharmaceuticals](#), [medical technologies](#), [financial](#) and [international services](#). The Agency reports to the Minister for Enterprise Trade and Employment. IDA Ireland operates under the terms of the Industrial Development Acts 1986 to 2003. IDA Ireland's activities are an integral part of the Irish Government National Development Plan(2007-2013) www.ida.ie

Science Foundation Ireland

In July 2003, SFI (Science Foundation Ireland) was established on a statutory basis under the Industrial Development Act, 2003. SFI was established to administer Ireland's Technology Foresight Fund. SFI provides awards to support scientists and engineers working in biotechnology and information and communications technology development. SFI began with an intensive study commissioned by the Irish government in 1998. www.sfi.ie

Enterprise Ireland

Enterprise Ireland is a Government organisation charged with assisting the development of Irish enterprise. Their clients are mainly Irish manufacturing and internationally traded services companies employing ten or more people. Enterprise Ireland also administers national and EU supports for building technological innovation capability and co-operation between industry and higher educational institutions. They provide a range of services to help international business access and evaluate appropriate and competitive sources of supply in Ireland. Enterprise Ireland is responsible for assisting overseas companies in the food, drink and timber sectors to locate in Ireland.

www.enterprise-ireland.com

Ireland - Global Rating Index

Ireland

The criteria below present the highest STD values and the lowest STD values (as they appear in the World Competitiveness Yearbook 2007) within each factor, and could thus be considered an economy's competitive advantages and disadvantages.

ECONOMIC PERFORMANCE		WCY 2007	
Strengths		Value	Rank
1.1.20	GDP per capita US\$ per capita	52719.5	4
1.1.21	GDP (PPP) per capita Estimates; US\$ per capita at purchasing power parity	39743.1	4
1.4.08	Youth unemployment Percentage of youth labor force (under the age of 25)	7.1	4
1.2.11	Exports of commercial services Percentage of GDP	29.8	4
1.3.17	Portfolio investment liabilities US\$ billions	213.5	6
Weaknesses			
1.3.06	Direct investment flows inward Percentage of GDP	-12.5	54
1.3.13	Relocation of production is not a threat to the future of your economy (Survey)	2.8	54
1.3.05	Direct investment flows inward US\$ billions	-25.0	53
1.5.02	Cost-of-living index Index of basket of goods & services in major cities, excluding housing (New York City = 100)	91.8	44
1.3.15	Relocation of services is not a threat to the future of your economy (Survey)	4.5	44
GOVERNMENT EFFICIENCY		WCY 2007	
Strengths		Value	Rank
2.2.08	Corporate tax rate on profit Maximum tax rate, calculated on profit before tax	12.5	1
2.2.13	Real corporate taxes do not discourage entrepreneurial activity (Survey)	8.0	2
2.3.06	Exchange rate stability Parity change from national currency to SDR, 2006/2004	0.0	2
2.4.07	Investment incentives are attractive to foreign investors (Survey)	8.6	2
2.2.12	Real personal taxes do not discourage people from working or seeking advancement (Survey)	7.3	3
Weaknesses			
2.1.10	Total reserves Gold and official reserves (gold = SDR 35 per ounce), SDR billions	0.5	54
2.2.09	Consumption tax rate Standard rate of VAT / GST	21.0	35
2.1.09	Management of public finances over the next two years is likely to improve (Survey)	5.6	34
2.2.01	Collected total tax revenues Percentage of GDP	30.3	26
2.3.05	Central bank policy has a positive impact on economic development (Survey)	6.7	23
BUSINESS EFFICIENCY		WCY 2007	
Strengths		Value	Rank
3.5.02	The image abroad of your country encourages business development (Survey)	8.8	1
3.5.04	Flexibility and adaptability of people are high when faced with new challenges (Survey)	8.4	2
3.2.19	Brain drain (well-educated and skilled people) does not hinder competitiveness in your economy (Survey)	8.0	2
3.2.20	Foreign high-skilled people are attracted to your country's business environment (Survey)	8.5	3
3.3.01	Banking sector assets Percentage of GDP	288.3	3
Weaknesses			
3.3.16	Stock market index Percentage change on index in national currency	3.1	50
3.2.05	Working hours Average number of working hours per year	1818.2	38
3.2.01	Compensation levels Estimates: Total hourly compensation for manufacturing workers (wages + supplementary benefits), US\$	22.9	37
3.2.14	Female labor force Percentage of total labor force	42.4	36
3.3.13	Stock market capitalization	57.0	29

INFRASTRUCTURE		WCY 2007	
Strengths		Value	Rank
4.4.10	Human development index Combines economic - social - educational indicators / Source: Human Development Report	1.0	4
4.5.09	University education meets the needs of a competitive economy (Survey)	7.6	4
4.1.22	Energy intensity Commercial energy consumed for each dollar of GDP in kilojoules	3733.7	4
4.5.08	The educational system meets the needs of a competitive economy (Survey)	7.1	5
4.3.22	Scientific research is supported by legislation (Survey)	7.3	5
Weaknesses			
4.2.01	Investment in telecommunications Percentage of GDP	0.2	54
4.2.06	Communications technology (voice and data) meets business requirements (Survey)	5.4	52
4.2.10	Internet costs Cost for 20 hours dial-up per month, US\$	31.1	50
4.1.16	Future energy supply is adequately ensured (Survey)	3.4	48
4.1.12	The distribution infrastructure of goods and services is generally efficient (Survey)	4.9	45

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IDA Ireland Economic Indicators 2006

<u>No. of Greenfield Projects</u>	<u>39</u>
—	
<u>No. of Expansion Projects</u>	<u>32</u>
<u>Capital Investment in Approved Projects</u>	<u>€2.6 billion</u>
<u>Average Salary in New Investments</u>	<u>€42,000</u>
<u>Annual Corporate Tax Payments of IDA Client Companies</u>	<u>€2.8 billion (est)</u>
<u>No. of Approved R&D Capability and Research, Technology Development & Innovation Projects by IDA Client Companies</u>	<u>54</u>
<u>Employment Creation (New Jobs)</u>	<u>11,846</u>
<u>IDA Supported / Initiated Industry – Academia R&D Collaborations</u>	<u>5</u>
<u>No. of IDA Client Companies investing more than €250,000 per annum on R&D</u>	<u>212</u>
<u>No. of IDA Client Companies with significant corporate R&D mandate</u>	<u>168</u>
<u>No. of IDA Client Companies with mandate to supply product and services to Europe, Middle East and Africa (EMEA) markets</u>	<u>500</u>

Appendix 8

Total Employment by Industry Sector in Ireland (MNC's only)

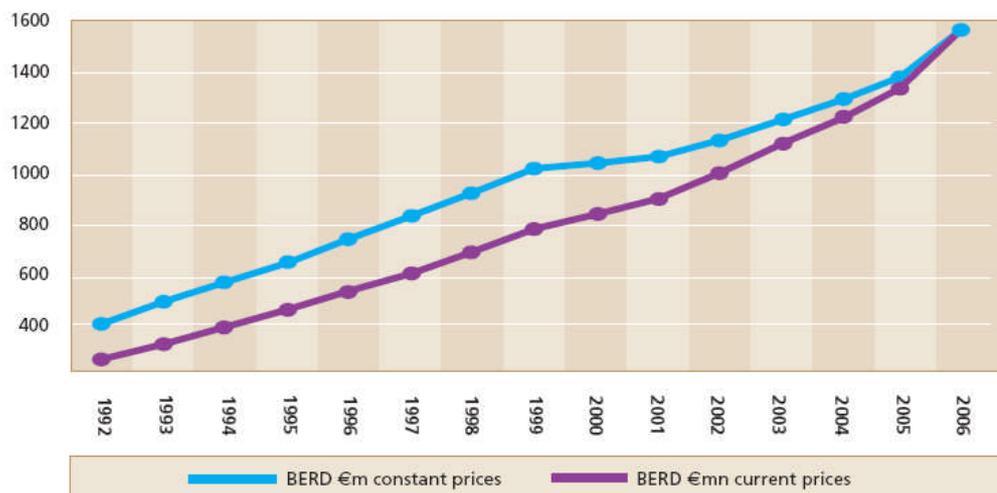
Sector	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Life Sciences	15,329	16,074	17,045	17,873	18,605	19,016	19,378	20,047	20,191	20,207
Clothing & Textiles	5,940	5,422	3,974	3,403	2,822	2,206	1,745	1,397	1,339	940
Food	505	476	477	680	818	880	915	918	1,006	1,033
ICT & Engineering	57,570	60,502	63,104	69,963	63,743	59,888	56,367	55,633	56,293	56,822
Misc Manufacturing	7,889	7,631	7,340	7,284	6,675	6,759	6,445	5,747	5,607	5,464
International Services	17,867	23,219	28,288	34,341	35,905	34,299	34,693	35,431	36,284	38,309
Financial Services	3,488	4,123	5,866	7,240	7,599	8,480	8,777	9,928	10,972	12,712

Forfas Publication

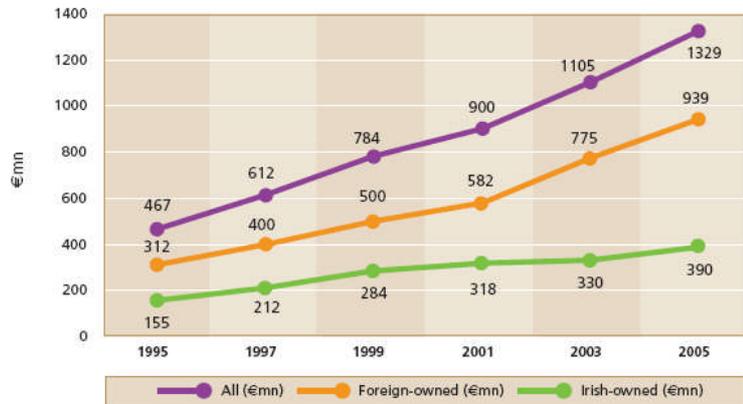
Research and Development Performance in the Business Sector in Ireland 2005/6

- ▶ Research & development expenditure performed by the business sector in Ireland rose to €1.33 billion in 2005. This represented an annual average increase of 9.7% between 2003 and 2005.
- ▶ Preliminary estimates for business R&D spending in 2006 indicate a further strong climb, with R&D expenditure growth expected to quicken to 17.3% to stand at an estimated €1.56 billion.
- ▶ Business R&D spending as a ratio of economic activity (Gross National Product) increased from 0.94% of GNP in 2003 to 0.98% in 2005. This ratio is expected to climb further in 2006 to 1.05% of GNP.
- ▶ Strong increases in business R&D spending and the level of BERD intensity has allowed for a narrowing of the gap between Ireland and the EU/OECD averages, which stood at 1.14% and 1.54% of GDP respectively in 2005.
- ▶ R&D spending in real terms in the business sector has nearly tripled in the last decade.

Business R&D spending in Ireland (1992-2006) €million

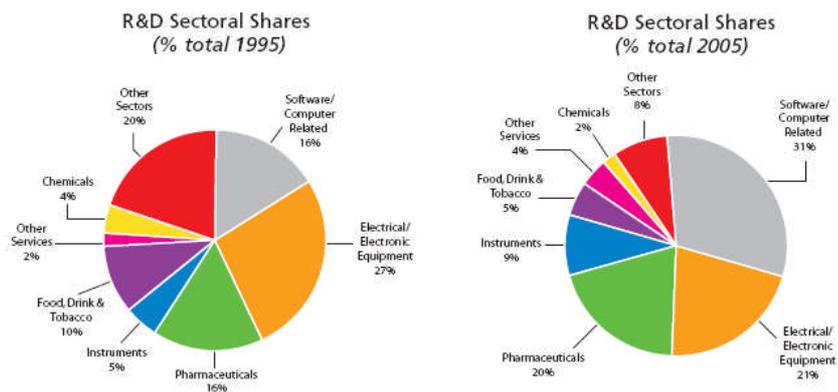


R&D spending in the business sector by ownership €million (1995–2005)



- ▶ The largest performing sector for business R&D in Ireland continued to be the Software/Computer Related areas accounting for 30.4% of all R&D investments in 2005. However, R&D spending growth in this sector was a relatively sluggish 6.8% between 2003 and 2005.
- ▶ R&D performed by business in the Irish Pharmaceuticals sector increased by 40.4% between 2003 and 2005. This sector now accounts for 20.1% of total business R&D.
- ▶ The Dublin region was the location for 41.2% of all business R&D performance in 2005, with the BMW accounting for 25.7% of the total and the rest of the country accounting for the remaining 33.1% of the total.

R&D sectoral share of total expenditure 1995 and 2005



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